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Alaska Oil and Gas Drilling Opportunities

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ALASKA OIL & GAS DRILLING AND PRODUCTION EQUIPMENT, SERVICES AND TECHNOLOGY OPPORTUNITIES

A study prepared for
Department of External Affairs

by

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1.0 RÉSUMÉ À L'INTENTION DES CADRES

1.1 Objectifs

Le principal objectif de la présente étude était de souligner les possibilités d'exportation de l'industrie canadienne pour répondre aux besoins de l'industrie pétrolière et gazière de l'Alaska dans le secteur du matériel de forage et de production, des services et de la technologie.

Le présent rapport tente d'esquisser les activités actuelles et futures menées sur terre et en mer en Alaska et de repérer les principales sociétés et personnes s'occupant de la conception, des spécifications et des achats.

À la lumière de la complexité des activités de l'industrie pétrolière de l'Alaska et de la rigueur de l'environnement nordique, les possibilités de ce marché d'exportation sont évaluées en termes généraux, pour tous les secteurs incluant les services, la technologie et les fabricants. Le présent document porte par suite sur le plus grand nombre d'aspects de l'industrie pétrolière de l'Alaska qui offrent des possibilités à nos exportateurs.

1.2 Buts de l'étude

- Fournir aux exportateurs actuels et possibles un document de travail sur lequel ils peuvent fonder leurs stratégies d'exportation.
- Fournir des données détaillées au gouvernement pour qu'il puisse soutenir l'industrie dans ses efforts d'exportation.

1.3 Introduction

Le potentiel en hydrocarbures connu de la zone arctique de l'Alaska de même que le caractère géologique extrêmement favorable de la région sont sans cesse confirmés par les programmes d'exploration en cours. Certains secteurs du gouvernement et de l'industrie estiment que l'Alaska recèle environ la moitié des réserves de pétrole futures des États-Unis.

L'ampleur des travaux actuels confirme l'existence d'importantes possibilités d'exportation dans les régions d'exploitation sur terre que l'on connaît déjà et, bien que moins certaine, l'existence de possibilités semblables pour les projets en mer actuellement à l'étude.

Tout compte fait, les possibilités d'exportation dans les deux cas sont excellentes et justifient l'adoption d'une attitude positive par l'industrie canadienne. Les exportateurs possibles doivent également prendre conscience que, dans certains secteurs, l'industrie canadienne est bien établie et qu'elle jouit d'une réputation enviable, ce qui crée donc un climat favorable au soutien de l'expansion de ce marché naturel.

Étant donné la nature de l'environnement et la faiblesse actuelle du prix du pétrole, les travaux d'exploration et de mise en valeur tendent à se faire au ralenti et avec prudence. Ils pourraient toutefois être considérablement accélérés par tout abaissement des coûts de mise en valeur et de transport, puisque ces coûts sont fréquemment le facteur qui restreint la mise en valeur des champs marginaux.

Voici la répartition approximative des coûts établis par l'industrie pour la production d'hydrocarbures dans les eaux peu profondes de la mer de Beaufort.

. Forage d'exploration	2 %	. Coûts d'exploitation	14 %
. Forage de mise en valeur	8 %	. Coûts de transport	34 %
. Structures et installations	11 %	. Impôts et redevances	31 %

Malgré la perspective incertaine des prix mondiaux du pétrole, le potentiel de l'industrie pétrolière de l'Alaska demeure prometteur tant à court terme qu'à long terme.

1.4 Structure du rapport

Le présent rapport a été expressément conçu comme document de travail commode donnant aux exportateurs des renseignements faciles d'accès qui peuvent leur être particulièrement précieux. En établissant l'information présentée dans le rapport, ses auteurs ont eu des échanges avec des grands participants industriels, incluant des sociétés pétrolières et de forage, des fournisseurs, des organismes gouvernementaux et des exportateurs canadiens.

La section 2 (Market Overview : Aperçu du marché) donne un bref aperçu de l'ensemble de l'industrie pétrolière et gazière sur terre et en mer, et porte particulièrement sur les travaux courants d'exploration, sur la production, sur le transport et le raffinage ainsi que sur les protagonistes en cause. Elle constitue une source utile de connaissances générales pour tout exportateur projetant de s'intéresser à se secteur.

La section 3 (Key Entities : Noms et adresses utiles) présente les principaux protagonistes à l'oeuvre dans l'ensemble de l'industrie, avec leur numéro de téléphone et leur adresse quand c'est possible.

La section 4 (Equipment and Technology : Équipement et technologie) décrit en termes généraux les différents équipements, le matériel, etc. normalement utilisés en Alaska. Elle est complétée par des données présentées à l'annexe B; on y trouvera les renvois pertinents aux codes et aux normes. Étant donné la rigueur de l'environnement nordique, il est également fait état des domaines de développement de la technologie.

La section 5 (Equipment Purchasing Channels and Methods : Méthodes et filières des achats de matériel) porte sur les aspects généraux de l'achat de matériel dans l'industrie, en indiquant les modalités d'achat propres aux domaines du forage d'exploration, de l'ingénierie et de la construction des installations de production. On y précise les modes d'achat de certaines sociétés et on y présente également un choix de projets.

La section 6 (Pricing : Prix) porte sur les coûts du commerce de l'exportation, incluant le change, le transport, les droits de douane, les tarifs et les taxes. Des tarifs douaniers supplémentaires sont aussi fournis à l'annexe M. La fin de la section propose une méthode d'élaboration de structure des prix.

La section 7 (Marketing Strategies : Stratégies de commercialisation) porte sur les possibilités et les moyens les plus vraisemblables par lesquels l'industrie canadienne pourrait avoir accès au marché pétrolier de l'Alaska. Cette section contient également des recommandations précises sur les façons d'être bien représenté dans un marché concurrentiel.

La section 8 (Appendices : Annexes) contient les renseignements détaillés auxquels on fait constamment référence dans le rapport. Ces données permettent en outre de mieux comprendre le fonctionnement actuel de l'industrie, ce qui peut multiplier les possibilités d'exportation.

1.5 Possibilités du marché

Le prix du pétrole étant en baisse, le rétrécissement des marges bénéficiaires force l'industrie à établir et à maintenir sa rentabilité en devenant plus productive. L'Alaska est l'une des rares régions du monde où la productivité peut augmenter substantiellement.

Cet accroissement de la productivité peut se faire en Alaska par le biais des économies d'échelle et par celui du progrès technologique. Les études menées sur les grands pipe-lines pour la mer de Beaufort indiquent que la rentabilité des champs qu'on espère découvrir dans les nouvelles concessions du bassin Diapir pourrait dépendre du transport. On estime que les coûts de transport constituent actuellement quelque 34 % des coûts de production.

En termes généraux, il y a lieu de prendre conscience que l'industrie canadienne est bien placée pour saisir les possibilités d'exportation qui existent dans ce demaine, sur terre comme en mer, en Alaska. Cette force tient au savoir-faire de l'industrie canadienne dans les domaines suivants :

- le matériel pétrolier en environnement nordique;
- l'équipement et les matériaux de traitement du gaz;
- l'exploitation en climat froid;
- la récupération améliorée du pétrole;
- la récupération et la production de pétrole lourd; et
- la technologie générale du forage.

De plus amples renseignements sur les sujets ci-dessus sont donnés à la section 4 de même que certaines indications sur les possibilités existant dans le domaine du développement de la technologie.

1.6 Stratégie globale

L'étude avait surtout pour but de déterminer les possibilités de l'industrie pétrolière sur terre et en mer de l'Alaska, compte tenu des difficultés que présente l'environnement ainsi que des besoins de l'industrie, du gouvernement et des citoyens. Les conditions économiques de ce marché laissent entendre que vraisemblablement l'exploration pétrolière en Alaska se fera dans le proche avenir à un rythme lent mais régulier par des sociétés se regroupant pour unir leurs efforts.

En Alaska, l'un des éléments clés est la réaction des divers groupes autochtones face au développement. Ces groupes sont suffisamment puissants pour freiner le développement s'il n'est pas dûment tenu compte de leurs intérêts. Par contre, en raison de leur connaissance des conditions locales, ils peuvent constituer d'intéressants associés dans tout plan de développement et toute stratégie globale de commercialisation.

Les sociétés autochtones perçoivent favorablement les perspectives de formation, d'emploi et d'affaires. Les efforts d'exportation qui leur conféreraient de tels avantages trouveraient probablement un écho extrêmement favorable chez eux. La section 7 donne un aperçu des principaux modèles d'associations entre des groupes autochtones et des exportateurs éventuels, laissant au lecteur le soin de décider s'il peut y trouver un profit quelconque.

Les coûts du transport constituant quelque 34 % des coûts de la récupération du pétrole, toute stratégie qui améliorerait la technologie du transport du pétrole et du gaz pourrait générer de substantiels avantages.

On incite enfin les exportateurs à exploiter le Programme de développement des marchés d'exportation pour procéder à l'évaluation du marché, pour participer aux foires commerciales et pour soutenir le développement de leur marché d'exportation. Les exportateurs auraient également avantage à tirer profit des conseils et de l'aide qu'offrent les services commerciaux du gouvernement, ses bureaux régionaux et le consulat général du Canada de Seattle, dans l'État de Washington.

1.7 Démarche

Toute bonne stratégie de commercialisation doit être suffisamment souple pour pouvoir être modifiée en fonction des conditions changeantes du marché et de la lutte livrée par les concurrents sur ce même marché. Les conseils détaillés qui suivent devraient permettre à l'exportateur de choisir la démarche de commercialisation la mieux adaptée à ses besoins.

- Obtenir une copie de l'annuaire téléphonique de l'Alaska Telephone Utility, qui contient des renseignements généraux (section 3.1).

- Entrer en relation avec le bureau régional du ministère de l'Expansion industrielle régionale pour obtenir des renseignements préliminaires sur le développement des marchés d'exportation (annexe L).

- Entrer en relation avec le consulat général du Canada de Seattle (Etat de Washington) et communiquer aux fonctionnaires du consulat son plan de commercialisation. Établir un contact périodique avec le consulat qui pourrait être en mesure d'offrir des renseignements à jour sur certaines questions (section 7.5).

- Entrer en relation avec les sociétés d'exploitation et de forage dans le but de les informer du service ou de la technologie qu'on offre par le biais d'une présentation (section 3).

- Penser à présenter des communications techniques aux foires industrielles, en soulignant le besoin du marché pour le produit offert (section 7.4).

- Penser à louer un stand aux foires industrielles du pétrole et du gaz. Etre en mesure de faire la preuve de la fiabilité de son service des ventes et de son service des pièces de rechange.

- Faire parvenir de la documentation aux ingénieurs sous-traitants, aux sociétés exploitantes, aux experts-conseils, aux sociétés de forage, aux fournisseurs, aux distributeurs, etc., en choisissant ces derniers en fonction du produit ou du service offert.

- Se rendre en Alaska et y séjourner quelque temps pour mieux connaître le marché envisagé.

- Entrer en relation avec les utilisateurs qui se sont montrés intéressés par le produit. Garder le contact et nouer de nouvelles relations.

- Consacrer du temps à bien étudier les fournisseurs et les distributeurs qui sont vraisemblablement les mieux adaptés aux produits ou aux services offerts. Les fournisseurs sont nombreux et il y a lieu d'étudier avec soin les options qui se présentent. Garder toute la souplesse voulue au besoin.

- Établir les façons préférées de mener les affaires des fournisseurs et des distributeurs de l'Alaska. Établir plusieurs comparaisons.

- Étudier en détail la question du transport car les options qui s'offrent présentent des écarts considérables de coûts. S'assurer que les délais de livraison sont bien définis, ce facteur pouvant déterminer votre crédibilité à long terme. Fournir des prix livraison incluse (section 6).

- Établir la classification tarifaire et la valeur des produits. Obtenir des avis définitifs du service américain des douanes (annexe M).

- Discuter de son programme d'exportation avec plusieurs courtiers des douanes et étudier avec soin les options qui s'offrent avant de choisir un courtier donné. Les coûts peuvent varier considérablement en fonction des relations préliminaires établies.

- Prévoir un budget réaliste pour l'établissement et le soutien de ses opérations de commercialisation en Alaska. S'assurer de la disponibilité des fonds voulus pour mener à bien les opérations courantes de commercialisation, ainsi que les questions de service et de soutien technique.

- Penser à prévoir un budget fixe de promotion pour que le fournisseur ou le distributeur fasse bien connaître le produit offert.

- Penser à offrir un rabais initial pour s'infiltrer dans le marché. Bien connaître les rabais courants offerts qui, en raison des conditions difficiles actuelles du marché, aident à faire rouler les stocks.

- Établir un bon système de communication avec les utilisateurs et les fournisseurs. Être prêt à réagir rapidement, efficacement et positivement à tout problème.

1.8 Sommaire

On estime que les régions arctiques, sub-arctiques et les régions en eau profonde recèlent des réserves sur place d'au moins 82 milliards de barils, pouvant être multipliées par un facteur de 3 ou 4 si les conditions géologiques étaient favorables. En outre, le nombre des sites d'exploration est énorme en Alaska, ce qui rend extrêmement probables les découvertes importantes.

En raison de la prédominance des grandes sociétés multinationales en Alaska, la faiblesse des prix du pétrole ne devrait pas gêner indûment la disponibilité du capital d'investissement. Pour la plupart de ces sociétés, le financement devrait demeurer raisonnable dans un avenir prévisible.

En règle générale, les travaux d'exploration du pétrole et du gaz s'accroîtront en Alaska en 1985, plus particulièrement dans la mer de Béring, située à l'ouest de l'Alaska, ainsi que dans la région du détroit de Cook. Au nombre des raisons qui expliquent cet accroissement, on compte la possibilité d'importantes découvertes, les effets cumulatifs des concessions offertes par l'État de l'Alaska et par le gouvernement fédéral américain ainsi que l'intérêt soutenu que portent les sociétés autochtones à la conclusion d'ententes portant sur l'exploration des terres appartenant aux autochtones.

L'industrie commence à peine à explorer l'immensité de la mer de Béring. Cette région est si grande et la taille des cibles géologiques si considérable qu'il faudra au moins plusieurs années encore pour en évaluer les possibilités. Bien qu'ils peuvent sembler défier l'imagination, les coûts des éventuelles découvertes ne devraient pas être nécessairement prohibitifs.

ALASKA OIL AND GAS DRILLING & PRODUCTION EQUIPMENT SERVICES AND TECHNOLOGY OPPORTUNITIES

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LIST OF ABBREVIATIONS

ACV - Air Cushioned Vehicle

ANWR - Alaska National Wildlife Refuge

AOGA - Alaska Oil and Gas Association

APOA - Alaska Petroleum Operators Association

ACI - American Concrete Institute

ABS - American Bureau of Shipping

ANSI - American National Standards Institute

API - American Petroleum Insitutute

ASME - American Society for Mechanical Engineers

ASTM - American Society for Testing and Materials

CVA - Certified Verification Agent

DnV - Det Norske Veritas

ETL - Electrical Testing Laboratory

FM - Factory Mutual

LPRC - Lease Sales Planning and Research Committee

MMS - Minerals Management Service as part of the United States Dept. of the Interior, Washington, D.C. 20240

NPR - National Petroleum Reserve

OCS - Outer Continental Shelf

TAPS - Trans Alaska Pipeline System

TSUSA - Tariff Schedules of the United States of America

UL - Underwriters Laboratory

USCG - United States Coast Guard

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I Pipeline Companies - Producing Statistics

J Royalty Oil and Gas Data by Field

K Arctic Petroleum Operators Association Member Companies and Reports Catalogue

L PEMD regional office information

M Tariff Schedules of the United States (TSUSA)

N Alaska Telecom, Inc. - Oil Patch Communciations, Prudhoe Bay

O Extracts from Final Supplement to Final EIS for OCS Lease Sale Schedule - Jan. 82 to Dec. 86

P Alaska Drilling Statistics for March 1985

1. EXECUTIVE SUMMARY

1.0 EXECUTIVE SUMMARY

1.1 Objectives

The main object of this study was to focus specifically on the drilling and production equipment, services and technology requirements of the Alaska oil and gas industry, in relation to export opportunities for Canadian industry.

The following report seeks to outline current and future activities both onshore and offshore Alaska, identifying key companies and contacts with respect to design, specification and buying decisions.

In the light of the complexity of the oil industry activities in Alaska together with the difficult northern environment, the export market potential has been evaluated, in general terms, for all sectors including services, technology and manufacturers. In consequence, this document attempts to address as many aspects of the Alaska oil business as are reasonably practicable.

1.2 Purpose of Study

- To provide existing and potential exporters with a working document upon which to base a corporate export strategy.
- To provide a detailed knowledge base for government to assist the industry sector in its export initiatives.

1.3 Introduction

The known hydrocarbon potential of arctic Alaska together with the highly favourable geology of the region continues to be confirmed by on-going exploration programs. Some sectors of government/industry perceive Alaska as having some 50% of the U.S.A.'s future oil reserves.

Present activity levels confirm that significant export opportunities exist in the known onshore areas and, while not quite as certain, similar opportunities exist in the offshore developments currently under consideration.

Altogether, export opportunities, in both the onshore and offshore areas, are excellent and warrant a positive approach by Canadian industry. Potential exporters should also be aware that, in some sectors, Canadian industry is established and highly regarded thus providing a favourable climate for further expansion into a natural market.

Given the nature of the environment and current oil pricing, exploration and development is tending toward a slower and more cautious pace. This could be accelerated substantially by lower development and transportation costs which frequently restrain development of marginal fields.

Industry has reported the following approximate cost distribution for shallow water Beaufort Sea production.

. Exploratory Drilling	2%	. Operating Costs	14%
. Development Drilling	8%	. Transportation Costs	34%
. Structures and Facilities	11%	. Taxes and Royalties	31%

Despite the uncertain outlook for world oil prices, the potential for Alaska's petroleum industry remains bright in both the short and long term.

1.4 Report Structure

This report has been designed specifically to provide a practical working document giving exporters ease of access to information which may be particularly relevant to them. In researching the information in this report, discussions were held with major industry participants including oil and drilling companies, suppliers, government bodies and Canadian exporters.

Section 2 - Market Overview - is intended to provide a brief synopsis of the onshore and offshore oil and gas industry as a whole, addressing current exploration, production, transportation and refining activities and the players involved. This section is a useful general knowledge base for any exporter planning on developing interests in the area.

Section 3 - Key Entities - summarizes the main players involved across the whole industry spectrum and provides contact phone numbers/addresses where possible.

Section 4 - Equipment and Technology - outlines, in general terms the various items of equipment, materials, etc. that are in normal use in Alaska. This section is supported by data in Appendix 'B' and includes reference to codes and standards. Given the difficulties of the northern environment, reference to technology development areas is also made.

Section 5 - Equipment Purchasing Channels and Methods - addresses the general aspects of procurement in the industry indicating purchasing patterns for exploratory drilling, engineering and production facility construction. Reference to specific corporate buying systems and selected projects is also made in this section.

Section 6 - Pricing - deals with costs to which exporters may be subjected including exchange, transportation, duties, tariffs and fees. Supplementary tariff schedules are also provided in Appendix 'M'. This section concludes with a suggested form of approach to developing a price structure.

Section 7 - Marketing Strategies - addresses the opportunities and the most likely means by which Canadian industry might access the Alaskan oil market. This section also develops point form recommendations on representation in a competitive market.

Section 8 - Appendices - provides comprehensive support documentation which is referred to continually, throughout the text of this study. Also these data encourage a greater insight into the industry as it currently operates which may generate further opportunity for export.

1.5 Market Opportunities

In an environment of declining of prices, profit squeeze causes industry to try and maintain profitability by becoming more productive. Alaska is one of the few areas of the world that holds the promise of substantially higher productivity.

Alaska offers two types of productivity opportunity; economies of scale and technological progress. Studies of pipelines on a general scale for the Beaufort Sea indicate that the economics of fields that will hopefully be discovered in the acreage opened by by the Diapir Basin lease sales may hinge on transportation requirements. Transportation costs are currently estimated at some 34% of production costs.

In general terms, it should be recognized that Canada's industry base is in a strong position to respond to export opportunities that exist, both onshore and offshore Alaska. This strength comes from the existing industry within Canada and includes expertise in the following:

. Oil field equipment know-how in the northern environment.
. Know-how with gas processing equipment and materials.
. Cold weather operational experience.
. Enhanced oil recovery expertise.
. Heavy oil recovery and production.
. Drilling technology in general.

Further, more detailed discussion on the above topics is given in Section 4 together with some indication of opportunities that exist for technology development.

1.6 Overall Strategy

The thrust of this study has been directed toward identification of opportunities that exist both onshore and offshore Alaska with due recognition of the difficulties of the environment and needs of industry, government and residents. The reality of market economics suggests that partnerships, joint efforts, and slow but steady exploration, will likely characterize the Alaskan oil search in the near term.

One of the key factors in Alaska is the role that the various native groups play in response to development. Such groups are powerful in bringing development to a stand-still if their interests are not properly respected. However, due to their local knowledge they can be attractive partners in development plans and overall marketing strategies.

Native corporations view prospects for training, employment and business opportunities favourably. Export initiatives, which can provide such benefits, would probably receive substantial co-operation from the local people. Section 7 outlines the principal models of association between local groups and potential exporters leaving the reader to consider his/her specific interest.

Since transportation costs amount to some 34% of oil recovery, a strategy which improves the technology of oil and gas transportation systems could generate substantial rewards.

Exporters are also encouraged to use the PEMD program to carry out market assessments, to participate in trade fairs, and to sustain export market development. The ongoing counselling and assistance available from government trade officials, regional offices and the Canadian Consulate General in Seattle, Washington are also of benefit to this development.

1.7 Approach

Any good marketing strategy must have ample capacity built in for improvisation as changing market conditions and field market work dictate. The following point by point outline should give exporters some guidance on development of an approach to marketing best suited to their needs.

. Obtain copy of Alaska Telephone Utility phone book for general information (Section 3.1).

. Establish contact with local DRIE office for initial guidance on Export Market Development (Appendix L).

. Establish contact with the Canadian Consulate General in Seattle, Washington, and appraise relevant officers of your business plan. Maintain contact with the Consulate periodically who may be able to offer up-to-date information on certain issues. (Section 7.5)

. Establish contact with operating and drilling companies with a view to holding a seminar or making a presentation on a particular service or technology (Section 3).

. Consider technical paper presentations at industry shows emphasizing suitability for proposed market (Section 7.4).

- Consider renting space in oil and gas industry shows. Be able to demonstrate good back-up sales and spare parts service.

- Mail literature to engineering contractors, operating companies, consultants, drilling companies, supply houses, distributors etc. on a selective basis best suited to product or service requirements.

- Visit Alaska and spend some time improving general awareness of the marketplace being considered.

- Contact end users who have expressed interest in a product. Maintain contact and develop.

- Spend some time thoroughly investigating the supply houses/distributors likely to be most suited to product or service needs. Individual supply houses vary substantially and options should be considered carefully. Maintain flexibility if needs arise.

- Establish supply house/distributors preferred method of doing business in Alaska. Obtain several comparisons.

- Address the question of freight in detail since the several options available present a wide variance in cost. Ensure scheduling of deliveries is fully determined since this may affect long term credibility. Quote fully delivered prices. (Section 6)

- Determine tariff classification and production value. Obtain binding rulings from U.S. Customs Service. (Appendix M)

- Discuss export program with several customs brokers and consider options carefully before choosing a broker. Costs can vary considerably depending on the initial relationship.

- Consider a realistic budget for the cost of establishing and maintaining a continuing marketing operation in Alaska. Ensure funds for regular marketing, service and technical back-up are properly addressed.

- Consider allocating a fixed promotional budget to a supply house/distributor to develop advance awareness of a product(s).

- Consider initial discounting to establish entry to market. Be aware of discounts in place to assist in moving inventories given recent difficult economic times.

- Establish a good communication system which will allow users/supply houses ease of contact. Be prepared to respond quickly, efficiently and positively to any problem.

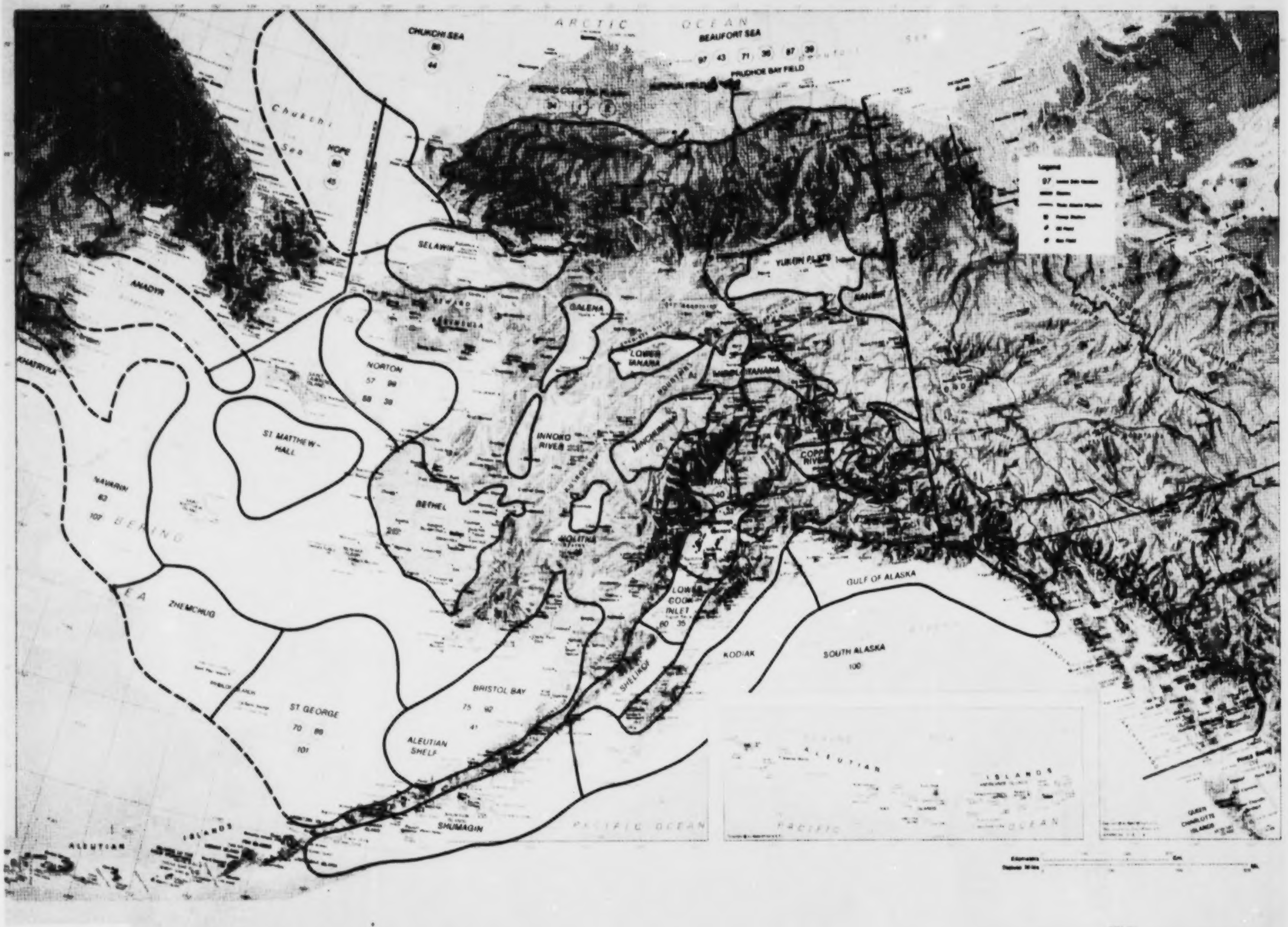
1.8 Summary

In arctic, subarctic, and deepwater areas, the baseline estimate of in-place reserves is 82 billion barrrels, with a potential multiplier of 3 to 4 should the geology prove more favourable. In addition, the size of exploration targets in Alaska is enormous, making the potential for giant strikes much higher.

Due to the dominance of large, multinational firms in Alaska, price softness should not unduly constrain the availability of investment capital. For most firms, financing should remain reasonable for the foreseeable future.

In general, oil and gas exploration activity in Alaska will be on the increase in 1985, especially in the Bering Sea off western Alaska and in the Cook Inlet area. Reasons for the upswing include the potential for large strikes; the cumulative effects of a consistent offering of State and Federal acreage and continued interest by Native corporations in developing agreements for the exploration of Native lands.

Industry is just beginning to scratch the surface of the vast, unexplored Bering Sea. The area is so great and the size of the geological targets so large that at least several more years of activity will be required to assess it. Although the economics of a discovery will be challenging, they should not necessarily be prohibitive.


ARCTIC OCEAN
CHUKCHI SEA
86
44
BEAUFORT SEA
97 43 71 36 87 39
PRUDHOE BAY FIELD
34
Chukchi Sea
HOPE
88
45
Legend
97
SELAWIK
YUKON FLATS
ANADYR
SEWARD
GALENA
LOWER TANANA
NORTON
57 99
88 39
MIDDLE TANANA
ST MATTHEW-HALL
INNOKO RIVER
COPPER RIVER
NAVARIN
63
107
BERING SEA
BETHEL
202
HOLITNA
ZHEMCHUG
LOWER COOK INLET
60 35
GULF OF ALASKA
KODIAK
SOUTH ALASKA
100
SHELIKOF
BRISTOL BAY
75 92
41
ST GEORGE
70 89
101
ALEUTIAN SHELF
ALEUTIAN ISLANDS
SHUMAGIN
PACIFIC OCEAN
QUEEN CHARLOTTE ISLANDS

2. MARKET OVERVIEW

2.0 MARKET OVERVIEW

2.1 Background and Opportunities

Alaska has significant production from its onshore areas and significant potential from its offshore areas. The onshore, which is comprised mainly of the North Slope, is producing about 1.5 million b/d. The offshore areas have only just begun to be exploited and largely remain unexplored to date.

The Alaska Outer Continental Shelf (OCS) is larger than the entire OCS along the coasts of the lower 48 states and totals approximately 815 million acres. Much of the hydrocarbon potential of the Alaska OCS is infered from seismic exploration and a small amount of drilling.

Since the FINAL SUPPLEMENT TO THE FINAL ENVIRONMENTAL IMPACT STATEMENT for the 1982-86 five-year OCS oil and gas lease sales schedule was released in March 1982, individual EIS's for Diapir, Norton Sound and St. George lease sales have been released. Appendix 'O' contains extracts from such EIS's which are presented for general information purposes.

Figures 2.1.1 and 2.1.2 at the end of this section give the Lease Sale Areas of Alaska OCS and the new Draft Lease Sale Schedule (March 1985) respectively.

Also for general guidance, Fig. 2.1.3 presents a possible development scenario for a 500,000 b/d production system on the Beaufort Shelf and Fig. 2.1.4 gives a general summary of principal activities (June 1985) - Alaska and Alaska OCS.

The onshore scene is of more immediate interest with new facilities being implemented and old facilities being upgraded with total monies of about US 8 billion allocated to development. The onshore areas are classed as mature producing areas. The amount of exploration work being undertaken onshore is relatively small.

For additional background to the industry base of Alaska, and in particular the oil industry, reference should be made to the Alaska Oil and Gas Association (AOGA) 1984 Economic Constituency Survey published in August 1984 and obtainable, free of charge, from:

- Alaska Oil & Gas Association (AOGA)
  505 W. Northern Lights Boulevard
  Suite 219
  Anchorage, Alaska 99503-2553
  (907) 272-1481

This survey discusses the results of a direct mail survey to the Alaskan industry suppliers and services which indicated that approximately 90% of Alaska's industry is linked to oilfield activities.

Also, the Resource Development Council published the proceedings of the fifth annual international conference on Alaska's resources in February, 1985 which is an excellent general information document entitled:

. Alaska Economic Priorities: A Five Year Strategy. This is available at a cost of US $37.00 plus postage from:

Resource Development Council
807 'G' Street, Suite 200,
Anchorage, Alaska 99501-3440

As noted in Sections 1 and 4 of this study major areas that appear to need further technology and equipment development for Alaska operations include:

. ice breaking vessels (limited by the Jones Act)
. arctic terminals
. pipeline design and installation (onshore/offshore)
. heavy oil recovery
. offshore production structures
. cold weather technology
. cold oil technology
. enhanced oil recovery systems
. gas processing equipment and materials

In general, with up to US $8 billion earmarked for development projects now and with continued exploration and optimization for new and more economical oil fields, extensive opportunities exists for supply of the complete range of oil and gas equipment and materials.

Given the existing industry base, it is felt that the best opportunities for equipment sales in Alaska are for innovative items since there is no established supply source for competitive goods. Canada is well-accepted as a source of innovation in equipment development, especially for cold weather applications. The present discount of the Canadian dollar relative to the U.S. dollar should also provide a competitive edge for Canadian suppliers. As discussed in earlier sections of this report, in most cases, cost is the main deciding factor in equipment selection provided specifications are met.

The following major projects are at various stages of completion which will all be completed by about 1990.

. Endicott
. Lisburne
. Milne Point

- Steelhead platform
- Kuparuk expansion
- Prudhoe expansion

For these, total monies of approximately US $8 billion have been budgeted. Historically, the average foreign content of these projects has been about 8 - 10 percent which amounts to some US $800 million over the next five years. With new technology developments, and particularly in the Canadian proficiency sectors, it is expected that the Canadian market share could increase.

It should also be noted that, due to the nature of the environment, general productivity levels in Alaska are open to substantial improvement. Industry would be very quick to recognize and develop any opportunity which would improve productivity since costs of operating in this environment are extremely high.

As discussed at length in Section 4, substantial opportunities exist for technology development. These opportunities range from refinement of existing systems to sophisticated leading edge, frontier technology. Development of sophisticated new technology, in some cases, could dictate the course of major financial expenditure in the oil and gas industry for both Alaska and Canada.

2.2 Geology and Products

Appendix 'F' provides geological and crude oil assay data on the Cook Inlet Basin and the Kuparuk and Prudhoe Bay fields.

Several of the proven fields on the North Slope are in cretaceous material extending out into the Beaufort Sea which is virtually unexplored. In addition, seaward of the cretaceous deposits are thick tertiary deposits which, like the cretaceous, are statistically oil rich worldwide.

The geological structure and the potential for giant finds offshore Alaska are the main reasons that the oil industry continues to look for oil, even though the exploration results to date have been disappointing.

The oil found in Alaska varies but is generally a sulphur-free oil with medium gravity (ie. 25 - 30 degrees API). However, there are vast known reservoirs which contain very cold, heavy oil which await production and technology development. Pilot projects are presently investigating production capabilities from these areas.

The gas produced from the Cook Inlet area is dry and sweet and needs only minor processing prior to being usable as fuel. The gas in the North Slope is reinjected to maintain reservoir pressure since there is no gas transportation system available.

2.3 Reserves

Figure 2.3.1 summarizes the known reserves of original oil in place on the North Slope distributed between 5 major fields in an area of 100 miles by 60 miles:

- Lisburne
- Kuparuk
- Prudhoe
- Ugnu
- West Sak

Only a fraction of the 60 billion bbl of known oil inplace is recoverable. For a detailed breakdown of reserves, refer to Fig. 2.3.2 attached.

Kuparuk is among the top ten largest oil fields in the U.S.; five of which are in Alaska. Waterflood operations will begin in 1986 to maintain field pressure and production levels. If successful this will allow extraction of 750 million of the estimated 1.6 billion bbls of recoverable oil in the formation.

The 9.6 billion recoverable barrels of Prudhoe Bay oil lies in the Sadlerochit formation 8,000 to 9,000 feet down. Investments in the Prudhoe Bay field total 13 billion dollars to date and are likely to reach 17 billion dollars before the pool begins to decline in the late 1980's. Prudhoe is already on waterflood and soon will be on tertiary miscible gas injection.

Endicott and Lisburne each contain about 300 million recoverable barrels and are scheduled to start production in 1987-88.

The North Slope, primarily in the Prudhoe Bay reservoir, is estimated to contain about 40 trillion cubic feet of gas. At this time there is no gas produced from the North Slope because of the lack of a transportation system. Further reference to pending transportation systems is made in Section 2.6.4.

The Cook Inlet area is a mature oilfield and its production rate is presently declining at 10 - 15 percent per year. A recent lease sale made more acreage available for exploration but industry, at this time, does not appear optimistic about the prospects.

The Bering Sea areas have estimates of reserves of several billion barrels but it has not yet seen the exploration drilling to prove this.

2.4 Exploration

Refer to Fig. 2.4.1 attached for the historic background on drilling data for the various regions.

2.4.1 Bering Sea

Major oil companies are ranking Alaska's Bering Sea with the Gulf of Mexico and waters off China, as 1985's hot prospects for large offshore discoveries.

The entire Bering Sea becomes ice free during the summer. Thus conventional drilling platforms - jackups, semi-submersibles, and drillships - can be used for exploration drilling. The drilling season varies, lasting four to five months in Norton Sound, and essentially year-round in the St. George Basin.

A fleet of six drilling vessels moved into the Bering Sea in 1984, inaugurating the biggest offshore drilling boom in Alaska's history.

The main main areas of interest are:

- Norton Sound
- Navarin Basin
- St. George Basin

The first lease sales were held in April, 1984 for the Navarin Basin with high bidders offering $631.2 million for 186 tracts at OCS Sale 83, including 20 in a disputed zone between the U.S. and Russia. Navarin Basin drilling is not expected to pose insurmountable obstacles. Water depths generally range from 300 - 600 ft. well within current capability.

A sale on the North Aleutian Shelf in Bristol Bay will be held late 1985 and follow-up sales are scheduled for all of these areas during the present five-year lease plan.

The first phase of Bering Sea activity included the drilling and abandonment of three expendable holes in Norton Sound and five more in St. George Basin. Open water drilling only will be performed for exploration drilling in the Navarin Basin using standarad semis in the 400 to 600 ft. water depth range.

Shell Oil Co. anticipate using jack-up's, semis and drill ships in a $540 million drilling program in 1985. A healthy share will go to test the Navarin Basin, St. George Basin and the Alaskan Beaufort Sea.

In Norton Sound, Exxon are planning to drill two more wells from a jackup in about 60 ft. water depth despite the disappointing results from 1984 exploration work. The environment in Norton Sound when compared to the rest of offshore Alaska, is relatively benign with exploration having been carried out previously during the open water season using standard jackups only.

2.4.2 Beaufort Sea

The offshore area of the North Slope, the Beaufort Sea, is also the site of considerable exploration activity although, due to high costs, exploration is proceeding at a slow controlled pace. There are plans for 8 wells:

- 2 at Antares by Exxon in 50' water depth
- 2 at North Star by Amerada Hess in 45' water depth
- 2 at Sandpiper Island by Shell in 50' water depth
- 1 at Harrison Bay by Tenneco in 60' water depth
- 1 at Camden Bay by Union in 110' water depth

Plans for several more wells by various operators are also in the early stages.

Texaco plan to delineate a recent discovery in the shallow water at the month of the Colville River. In addition, Exxon are planning to do further oil exploration in the Point Thompson area. This area has substantial proven gas reserves.

2.4.3 Cook Inlet

There has been little exploration onshore in the Cook Inlet area. A recent attempt to sell Cook Inlet oil overseas is the subject of ongoing debate. If successful this would increase the economics of Cook Inlet oil which would increase incentive to drill in the area.

Beard Oil Company also anticipates drilling exploratory wells commencing in October 1985 in Cook Inlet just off Catenary Island, 22 miles west of Kenai.

2.5 Production

Prudhoe Bay oil production is expected to peak in 1988. The Trans Alaska Pipe Line Systems (TAPS) will continue to carry North Slope oil well into the next century. About 600 wells are currently producing at a calculated maximum rate of 1.7 million barrels per day. The daily flow would be half of what it is today without production and enhancement methods.

At present, estimated flow from North Slope fields is made up of:

. Prudhoe	1.5 million b/d
. Kuparuk	0.2 million b/d

Production from all North Slope fields is expected to peak in 1988 at 1,825,000 b/d with the startup of Lisburne, Endicott and Milne Point fields plus the increase in capacity of the Kuparuk field.

Figures 2.5.1 Sheets 1 and 2 give details of well locations on the North Slope from Harrison Bay to Flaxman Island.

The Cook Inlet region onshore production is almost entirely gas, whereas offshore production is almost exclusively oil. The Cook Inlet region has been under production since the early 1960's but oil production is currently descreasing at 10-15 percent per year. Recent offshore oil exploration in Upper Cook Inlet has yielded no commercial finds leaving the future of the area in doubt. Recently a lease sale was held in the Lower Cook Inlet to make more acreage available for exploration in the hope that oil production levels can be maintained for the area. Fig. 2.5.3 gives the field and facility location map for the area.

Onshore gas production in the Cook Inlet Area began in the early 1960's and has been used almost exclusively for local power generation. Local demand is increasing and will likely continue to consume most of the onshore gas production. There are plans to expand production and install another LNG facility on the Kenai Peninsula. Further reference to this is made in Section 2.6.4.

The only significant offshore gas production is from Phillips' North Cook Inlet field. The gas is transported via pipeline to Phillips' own LNG plant on the east side of Cook Inlet and then to its final destination in Japan. However, Marathon are designing a new structure for gas production in the Cook Inlet for deployment in 1986.

2.5.1 Arco

A recent announcement by ARCO Alaska Inc. stated that the company planned to embark upon a deliberate and measured pace of continued production and development which would include moving forward with already committed projects at Prudhoe, Kuparuk and Lisburne.
The restructed company will emphasize:

- A reserve addition program involving exploration, producing technology and acquisition.
- Existing domestic and international oil and gas producing operations.
- Domestic and international coal operations.
- U.S. west coast petroleum refining and marketing operations.
- A proprietary and specialties chemical company.
- Most of the existing petroleum transporation operations.

The company will be a substantial net producer of oil and gas.

A major expansion of the Kuparuk River oil field has now been completed following the installation of a second Central Production Facility and the tripling of accommodations at the Kuparuk Operations Center. Arco says the output from the field is now about 200,000 barrels per day having initially produced at about 115,000 barrels per day. A third development stage will increase production to 250,000 b/d in 1986.

The new Kuparuk Industrial Centre was opened in late 1984 and offers the only industrial shop space, storage facilities office space and personnel facilities available to the support sector within 40 miles of the Kuparuk project. Further reference to this facility on the subject of pricing is made under Section 6 of this study.

The North Slope Borough, in developing and owning the Kuparuk Industrial Centre, prohibits any duplication of its services or facilities in the Kuparuk area. The only exception is oil company facilities.

A 24-inch diameter pipeline has now been commissioned and will carry Kuparuk's increased production the 26 miles to TAPS at Prudhoe Bay.

The new facilities, for the Kuparuk expansion, were delivered to the North Slope on the 1984 summer sealift.

The 2 billion dollar sea water injection project for Prudhoe Bay, which began in 1984 is expected to sustain pressure and guarantee recovery of an additional 1 billion barrels of oil. The owners of the Prudhoe Bay field are gearing up for a tertiary recovery program estimated to produce 12% more oil from the field (about 1 billion barrels). This 750 million dollar Prudhoe Bay miscible gas project could start as early as 1987 and become the largest of such programs ever undertaken. It will involve a 5 step expansion of the small scale gas flood which Arco began in 1982, and will involve some 200 wells (50 for injection). About 10% or 13,000 acres of the Prudhoe field area will be involved in this program.

This system works in harmony with the water flood system in what is described as a water alternating gas enhanced recovery method (WAG). Miscible gas is a hydro carbon gas, enriched with light natural gas liquids which combine with the crude oil. Gas and water are injected alternatively in repeated cycles which act to push the gas/oil to production wells. The project is currently under development as a combined effort of Prudhoe Bay interest owners involving Sohio, Arco and Exxon.

Arco has estimated that the Lisburne field could begin producing about 100,000 b/d by late 1986 or early 1987 and, having received all permits required, they are now proceeding with construction plans. The production facilities are expected to cost $800 million and the drilling program, $874 million.

Arco has also committed $85 million to a pilot project to determine whether West Sak oil can be economical to develop. With 25 billion bbls of oil in place this may be the largest accumulation of oil in place in the USA. The development requires gravel roads and pads to insulate against thermal erosion together with more wells due to the shallow reservoir depth. Experimentation with screens, liners and various completion techniques continues in an attempt to resolve the production problems.

2.5.2 Sohio

Sohio anticipates investing 2 billion dollars in Alaska over the next few years in both Prudhoe and Endicott.

Final permits were obtained by Sohio Petroleum to develop the Endicott field off the North Slope of Alaska, where recoverable reserves are estimated at 350 million bbl out of a total of 1.1 billion in place.

The first Beaufort Sea development will begin producing 100,000 b/d in 1988. The $2 billion project will have two gravel islands: a main production island with processing and accommodation facilities and a satellite drilling island that will house almost all of the planned 120 development wells. Water depths range from six to 10 ft. Sohio plans to sink the development wells at the rate of 30 wells per year.

Sohio, which holds a 56.8% interest in the reservoir, intends to begin construction of the gravel production island and the satellite drilling island by later this year. The islands are likely to require more than 6 million cu. yd of gravel, which is five to six times the amount required for the Mukluk structure. Two causeway bridges are scheduled for delivery on the 1985 sealift.

Production modules are scheduled for fabrication beginning late 1985 with completion and shipment to the site planned for 1987. The pipeline network is slated for installation in 1986-87. The construction contract for $50 million process modules was recently awarded to Brown and Root who plan to use their New Iberia, Louisianna yard for fabrication. The modules will be towed to the North Slope via the Panama Canal.

2.5.3 Exxon

The first two wells on Exxon's Antares prospect have been drilled to a depth of 8,450 ft. plugged and abandoned. No results of the wells have been released. The site is in 50 ft. of water about 115 miles northwest of Prudhoe Bay.

Recent reports from Exxon state that the company is planning aggressive exploration in waters off Alaska ranging from the Beaufort Sea to the Norton and Navarin Basins.

2.5.4 Shell

Shell Oil Co. has announced that some 300 million barrels of crude oil can be recovered from fields off the company's Seal Island exploration base and that the field appears to be large enough to warrant production. The estimate of recoverable oil reserves is based on results of three confirmation wells since the discovery well was completed in January, 1984.

Shell, who operated the exploration wells, estimates it has a 20 to 30 percent interest in the field. Other companies with interests in the field are Amerada Hess. Amoco Production Co., Texas Eastern Exploration and Murphy Oil. The operatorship of the field is yet to be determined.

Seal Island is an artifical gravel island five miles off Alaska's coast and some 12 miles from the northern edge of the Prudhoe Bay field. Shell envisions building a subsea pipeline to connect the Seal Island discovery with the TAPS and has indicated that oil could begin flowing by 1992. Shell has also indicated that this is one of the most important finds it has made in the last 5 years.

The oil underneath Seal Island is in the Sadlerochit formation; the same formation that contains the producing reservoir at Prudhoe.

Shell Western E & P Inc. contracted with AIC-Martin JV, Inc. of Fairbanks to build a gravel island in the Beaufort Sea. The $29 million project is located in 49 ft. of water, about 11 miles west of the Shell Western-operated Seal Island. Construction of "Sandpiper" Island began in December on OCS Y-0370, NR-6, Block 424 and will be ready for a drilling rig in mid-summer. It is expected that the planned exploratory wells will test a different formation than the Sadlerochit formation.

2.5.5 Conoco

Conoco Inc. is currently building oil production modules in Everett, Wash., for transport to Alaska's North Slope. The sealift is expected to consist of 3 barges going to the West Dock, all carrying production and well pad modules destined for Milne Point located 35 miles northwest of Prudhoe Bay.

Beginning early 1986, the units are expected to handle 30,000 b/d of oil production from the 100 million barrels recoverable from the Kuparuk River/West Sak sands reservoir extensions at Milne Point.

The largest of the eight primary modules, the 1,555 ton gas compression unit, is 123 ft. long, 64 ft. wide, and 77 ft. high. The units have a combined weight of 8,200 tons.

The production complex, made up of 11 modules and 13 major skid base units, was designed and procured by Fluor Engineers Inc.

The Milne Point project, which is to cost about $787 million in four phases during 8 years, will be the first commercial scale, third generation, North Slope oilfield development.

2.5.6 Marathon

Marathon are continuing development in Cook Inlet with the installation of the "Steelhead" production platform and 103,000 ft. of pipeline. The initial function of the platform and pipeline system would be to recover gas from the Grayling Gas Sands with 48 wells drilled through the piles which would act as drill slots. Platform installation is scheduled for June 1986 with drilling in November 86 and production in January 1987.

2.6 Product Transportation

The petroleum industry has been conducting research into crude oil transportation systems from offshore Alaskan areas leased by the U.S. Government for several years. This section will briefly address existing in place systems and expand on plans considered for the Beaufort and Bering Seas in the event of commercial development. Comment on the proposed trans-Alaska gas pipeline is also made.

2.6.1 Existing Facilities

The Trans Alaska Pipeline (TAPS) was completed in 1977 and carries about 1.7 million b/d of oil from the Prudhoe Bay area to the VALDEZ terminal, 120 miles East of Anchorage. TAPS is owned by the Aleyeska Pipeline Company which is a conglomerate of interested operating companies in Alaska.

2.6.2 Bering Sea Crude

Bering Sea production will likely be far from shore and in deep waters. In the Bering Sea, ice is a major design consideration which can be considerably more severe for longer periods in the northern Bering Sea than in the southern part.

In the Bering Sea, scouring of the sea bottom by ice features is likely to be a problem only in Norton Sound, which is relatively shallow. Scouring is expected to be such that trenches for subsea pipelines from Norton Sound to shore might have to be buried about 5-10 feet. Also, subsea permafrost probably does not exist in Norton Sound.

Even though sea-to-shore pipelines might be feasible for Norton Sound and other Bering Sea basins relatively close to land, they are unlikely to be cost effective for Navarin Basin, because of the distance from shore.

A recent study for the MMS was completed in July 1985 entitled "Evaluation of Bering Sea Crude Oil Transportation Systems" which is available as a two-volume document from:

- National Technical Information Service,
  5285, Port Royal Road, Springfield,
  Virgina 22161 Tel. 703-487-4780

This study looked at northern/central/southern Bering Sea regions and concluded that an offshore terminal for storage and shuttle transportation by ice strengthened tanker is probably the best choice for all three regions.

For each of the three regions, two icebreakers would also be required to carry out support work such as escorting the tankers through heavy ice, clearing the terminal area of ice, and transferring personnel and supplies.

Even though the transportation systems would be similar for the three regions, each would have different kinds of storage terminals and different specifications for the tankers and icebreakers. These would accommodate differences in severity of weather, ice conditions, and many other factors typical of each region. Earthquake considerations would be particularly relevant to facilities at the southern end of the St. George Basin and in the North Aleutian Basin.

Extracted from this study, Figure 2.6.1 suggests possible locations of the three offshore facilities together with tanker routes and distances from Dutch Harbour.

Also, the study report states that these conclusions will need re-evaulation if:

- Two or more major oil discoveries are developed simultaneously which could share a transportation system.
- The characteristics of a discovery vary significantly from those used to prepare the study report.
- Commercial quantities of gas are discovered along with the oil.

Transportation systems for remote Bering Sea locations will require state-of-the-art technology and large investments. Design and operation of tankers and terminals in the presence of ice is one of the problems being addressed by industry research. However, the biggest challenge may be to determine the most cost-effective transportation system for a given production scenario. Many options exist and a number of tradeoffs have yet to be evaluated. Full-scale testing with existing ice-capable vessels will probably be required to calibrate such studies before they are used as bases for major investment decisions.

2.6.3 Beaufort Sea Crude

For carrying oil from production structures in the OCS waters of the Beaufort, trunk pipelines may be buried subsea to tie into TAPS. Trunk pipelines are a probable choice because water depths in the Beaufort Sea are relatively shallow which facilities pipeline laying. Present exploration activity also suggests that most offshore platforms/islands may not be too far from the shore.

Special technology is being developed to protect trunk pipelines from the arctic environment. In shallower waters the main hazard is from scouring by the keels of large ice features, such as pressure ridges. In the Beaufort Sea scour can be found in water depths of up to approximately 50 m, and can reach a depth of about 5 m below the undisturbed seabottom. Scour frequencies and depths observed in the Beaufort Sea indicate that this phenomenon is likely to govern the feasibility of installing pipelines in this environment. Further reference to Sections 2 and 4 should be made for comment on opportunities for technology development.

As a result of high transportation costs, industry research projects concerning petroleum transportation from offshore Alaskan wells commenced in 1968. A series of projects have been undertaken by a variety of concerns with records being kept by the Arctic Petroleum Operators Association on behalf of the Lease Sale Planning and Research Committee (LPRC). Appendix 'K' provides a listing of APOA reports available for purchase.

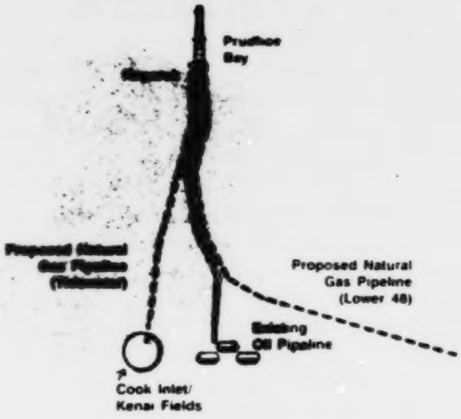
2.6.4 Gas Pipelines

Yukon Pacific Corp. recently announced that it is considering four possible routes and terminals for the proposed trans-Alaska gas pipeline.

Recent reports indicate that Yukon Pacific is considering agreements with Japanese and/or Korean firms to perform the studies required. On the American side would be ARCO Alaska, a gas seller, and Yukon Pacific, a gas transporter.

The group had originally hoped for the line to go to the Kenai Peninsula, specifically Nikiski, but three other termination sites were now also being considered.

Existing and Proposed Oil and Gas Pipelines
State of Alaska



The other three sites being considered include Valdez, Point Gravina and a Cook inlet area. The first two probably would entail construction of a line parallel with the trans-Alaska oil pipeline. Point Gravina is in Prince Williams Sound south of Valdez and north and west of Cordova.

One of the early decisions should determine whether the line should be all-Alaskan or should traverse Canada and connect with a line already built in northern Idaho to serve the Lower 48. Other economic factors include assessment of the size of the potential Japanese gas market.

Recent reports suggest that the estimated cost of US $14 billion plus the present export policies which restrict the ability to export North Slope petroleum products, may have a negative impact on development of such a facility within the 1980's.

Arco has recently let a contract to Fluor Engineers to study the merit of a trans-Alaska gas pipeline.

2.6.5 Summary

Two main methods are used to move crude oil from offshore platforms to onshore refineries; pipelines and tankers. By constructing an offshore storage terminal, both methods could be combined. For arctic and subarctic conditions, pipelines, tankers and terminal facilities have to be adapted or newly designed in many instances. Additionally, transport systems must be tailored to the unique characteristics of each producing area.

In general, for crude oil transportation, pipelines are the more likely choice in the Beaufort Sea and tankers are the more likely choice in the Navarin Basin of the Bering Sea. Other basins in the Bering Sea require additional study before transportation systems can be selected.

2.7 Refining

1984 has seen substantial expansion of Alaska's refining capacity. In October 1984, Mapco completed the asphalt unit, being the first stage, of a $60 million expansion program that will double its total capacity. Asphalt production for Anchorage and Fairbanks will begin Spring 1985 with a capacity of 2,300 barrels per day. The gasoline phase of the expansion should be complete by early 1986, with a capacity of 5,000 barrels per day and is likely to result in lower gasoline prices for Interior Alaska. Mapco is expanding its stove oil and jet fuel operations as well.

Tesoro Alaska commenced a $93 million expansion of its Kenai refinery in September 1984 when long-term royalty oil contracts with the State of Alaska were finally signed. When complete in September 1985, Tesoro's refinery input will go from about 15 percent North Slope "scour" crude to a full 100 percent. To date, Tesoro has primarily Cook Inlet "sweet" crude, with a total capacity increase of 56%. Tesoro is expected to expand its refinery again in the near future to improve residual processing.

Aside of existing refinery facilities there is some interest in constucting a refinery at Valdez, the terminus of the Trans Alaska Pipeline. A large Korean construction firm, Hyundai Corporation, and two Japanese firms, C. Itoh and Nisho Iwai, are evaluating a light refinery operation that would allow the exportation of North Slope petroleum products without violating the Congressional crude oil export ban.

Figure 2.7.1 attached, provides a concise summary of Alaskan petroleum processing plants complete with product data and shipping destinations.

2.8 Men/Equipment/Supplies

Regarding transportation of men, equipment and supplies for near-shore activities, substantial research efforts are now being directed toward the use of arctic type ACV's. The air cushion vehicle is seen as complementing rather than supporting present transportation systems and is able to operate with cargoes and in locales and environments beyond the existing capabilities of conventional trucks/helicopters and ice-breaking tugs.

Applications of such vessels include:

- transport of cargo and passengers to offshore islands and structures in the Beaufort Sea
- transport of cargo and passengers along shallow waters and tundra in the Arctic; and
- shallow water seismic and survey

All the 1984 exploration wells were supplied from Captains Bay near Dutch Harbour on Unalaska Island in the Aleutian Island chain. Offshore Systems Inc. operates a 40 acre support base with a deepwater service dock, warehouses, storage area, fuel storage tanks, and a trailer camp. Crowley Maritime Corp. also operates a support base in Captains Bay, but is not expected to support future St. George activity. Typically, two to three supply boats are available to support each rig.

Helicopter support for crew and miscellaneous supply shuttles is based at the Cold Bay airport on the Alaska Peninsula.

The Pribilof Islands are likely to be the site of oil support bases for exploration in the Navarin Basin OCS area, owing to suits which tied-up support base locations on St. Matthew Island. The St. Paul base is about 350 miles from the Navarin Basin, while St. Matthew is about 150 miles from most locations. Plans for harbour and air support improvements on St. Paul and/or St. George Islands are in hand.

Construction is expected to begin Summer 85 on a $3 million camp by a subsidiary of the regional Aleut Corporation on St. Paul.

The support facilities for remote Bering Sea exploration in Norton Sound previously used by both Arco and Exxon were similar. A warehouse barge for each well was brought from Seattle carrying the bulk of the materials and equipment needed for exploratory drilling. The barges stored well casings, cement, drilling mud, and other drilling materials.

Helicopters transferred crew members and some additional supplies between Nome and the drill rigs. Nome is planning to expand its port for servicing the offshore oil industry but has not yet received the required financial backing.

Exxon, Arco and Amoco have plans to drill in Navarin Basin starting around mid-May, 1985 depending upon when the ice clears from the drill sites. The extreme environments and isolation of the sites will pose significant operational problems on the exploration activities. The drill sites are a 650 mile round trip from Dutch Harbour and Captains Bay. To ease the resupply problem Amoco anticipate stationing a specially-converted bulk cargo carrier near their drilling site for storage of drilling and potable water, and rig and helicopter fuel.

2.9 Politicial/Environmental Considerations

The State of Alaska has applied to export the Cook Inlet oil to the Far East and replace it with North Slope oil. So far, all oil produced in Alaska is shipped to the lower 48. Since the transportation cost of oil to the Far East is about $1/barrel versus $4/barrel to the lower 48, this would result in a net saving of about $3/barrel for the Cook Inlet producers. It would also increase the royalty payment to the State, since the royalty is based on the wellhead price (world price minus the transportation cost). A decision has not yet been made on this issue but if it were approved the economics would favour increased Cook Inlet oil production if additional reserves can be found.

World oil prices will continue to be a dominant factor in exploration plans and in Alaskas revenue future.

Recent views expressed by oil economists indicate the following possible trend regarding oil prices in the near and intermediate term:

1. Oil prices are likely to continue downward by 2 to 5 dollars or possibly further in the next 5 years.
2. There is some danger of a price collapse.
3. There is little probability of oil prices rising in real terms over the next decade.

Industry has stated that the easiest part of the research for oil in the Arctic today is the actual drilling operations with the most difficult part being the satisfaction of permitting and regulatory requirements and overcoming the discouragements which those factors inevitably introduce into company plans and strategies for Arctic exploration.

Industry continues to advocate a better relationship between the oil industry and the regulatory agencies in Alaska, and a better understanding of the long term importance of Alaskan oil to the nation's future security.

A positive factor for Alaskan oil production is the possibility of the U.S. Government levying an oil import tax in 1985 in an effort to reduce the Federal deficit. An import tax could be politically appealing and would make Alaskan oil more price competitive which may enhance industry interest in Alaska exploration and development.

2.10 Product Statistics

For general information, statistical data on the value of imports of oilfield and drilling equipment into the U.S. is presented in this section. Source data was obtained from the U.S. Customs and the U.S. Department of Commerce.

Comprehensive surveys of U.S. industrial and business activities are carried out every five years, covering years ending in "2" and "7". Of interest to this study is the Census of Manufacturers for Construction, Mining and Materials Handling Machinery and Equipment which is one of a series of 82 industry reports providing statistics for groups of related industries. This group covers SIC (Standard Industrial Classification) 3531, 2, 3, 4, 5, 6 and 7 with SIC 3533 being the classification for oilfield machinery.

Table 2.10.1 shows the value of selected pieces of drilling equipment imported into the United States in 1983. The total dollar value of U.S. imports is given followed by a breakdown of leading exporting countries.

Table 2.10.2 demonstrates the changes in Canadian market share of three main categories of oil industry equipment from 1980 to 1983.

Discussions with U.S. purchasers indicated an overall awareness of Canadian products in the Alaskan Oil and Gas industry. Several individuals also stated that Canadian goods were viewed as premium items. No one considered that Canadian equipment was of poor quality and reputation and since many products are already imported into Alaska, there was little concern for after sales service and parts availability.

Discussions with Canadian exporters confirmed that the main competition was from the lower 48. In cases where the competition was established in Alaska, the need for a strong continuous presence was preferable to part-time agents in order to compete. Some exporters also indicated that their strategy in overcoming problems had been developed over a long period of time and that it was not in their interests to give out information.

The response to Canadian Government enquiries for data contribution to the study was excellent, totalling some 300 companies active in all sectors of the oil and gas industry. Respondents to the 1984 study for the California oil and gas industry have also been included in the data review since industry interests are similar.

2.11 Jones Act

For marine transportation, the Jones Act applies, which limits the ability of foreign-flagged vessels (Canadian included) to carry cargo between two U.S. ports. For instance, the Act would prohibit Canadian vessels or barges from carrying a product or passengers from Seattle to the Alaskan Beaufort. For guidance to potential exporters, the Jones Act is considered to affect the following oil and gas industry related marine equipment:

1. Tankers
2. L.N.G. Carriers

3. L.P.G. Carriers
4. Integrated tug barge units for transport of No. 1, 2, & 3 above.
5. General Cargo Vessels
6. Heavy Lift Vessels
7. Dry Tow Vessels (Self Propelled)
8. Special Light to Medium Vessels
    A. Swath
    B. A.C.V.
    C. Hydrofoil
    D. S.E.S.
9. Tugs
    A. Port Tug
    B. Dredge Assist Tug
    C. Hopper Barge Handler Tug
    D. Ice Strengthened Tugs
10. Ice Breakers and Support Vessels
11. Barges
    A. Deck
    B. Tank
    C. Combination
    D. Bottom Dump Hopper
    E. Ice Strengthened Cargo/Fuel Barges

In summary, U.S. maritime legislation (including the Jones Act) restricts the use of foreign (non-U.S.) built vessels in U.S. coastwise trade (i.e.: the transport of merchandise and/or passengers between points in the U.S.A.), and for purposes such as dredging, towing or salvage operations in U.S. waters. Due to the complexities of the legislation, Canadian exporters should establish whether or not those restrictions apply to their particular situations.

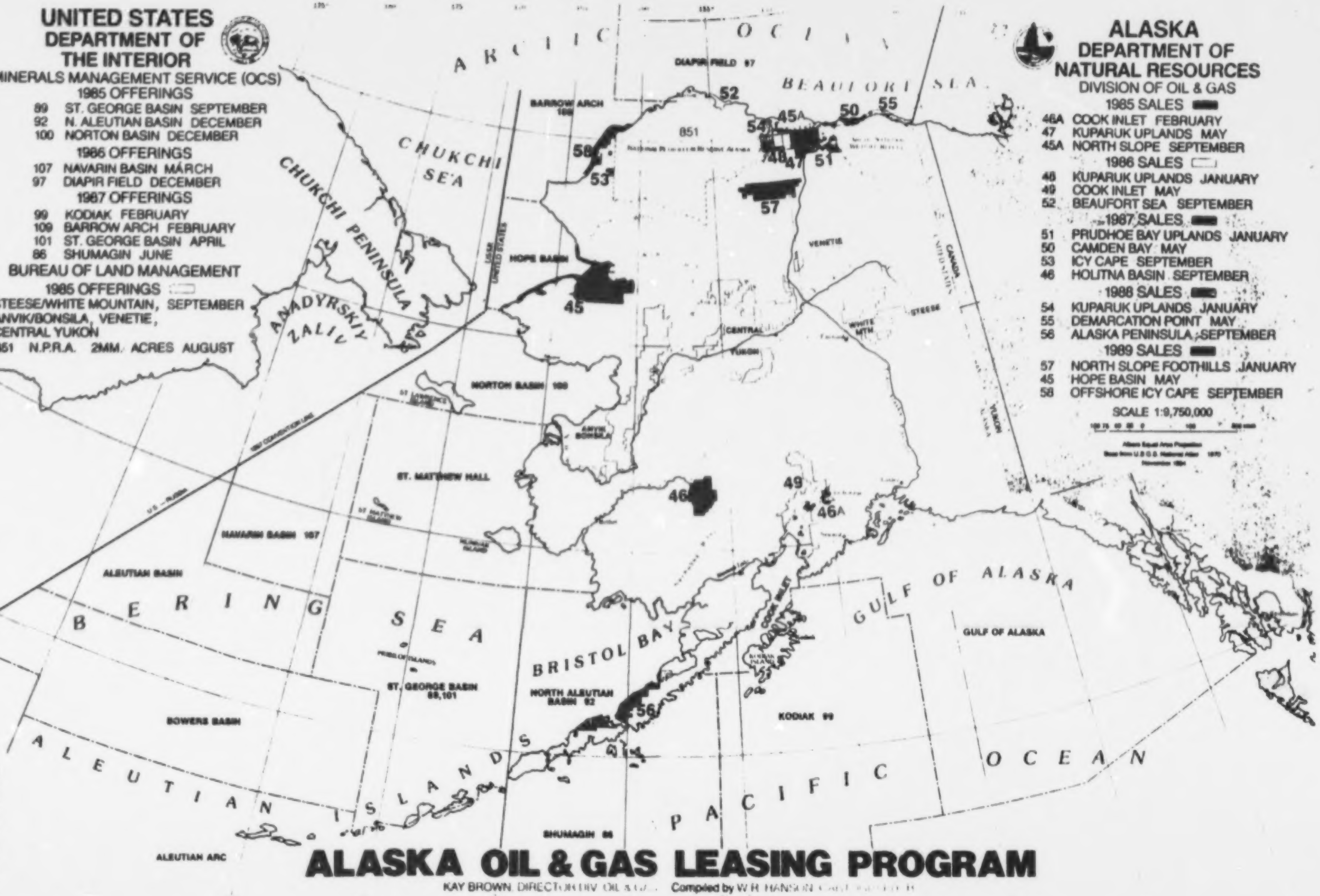
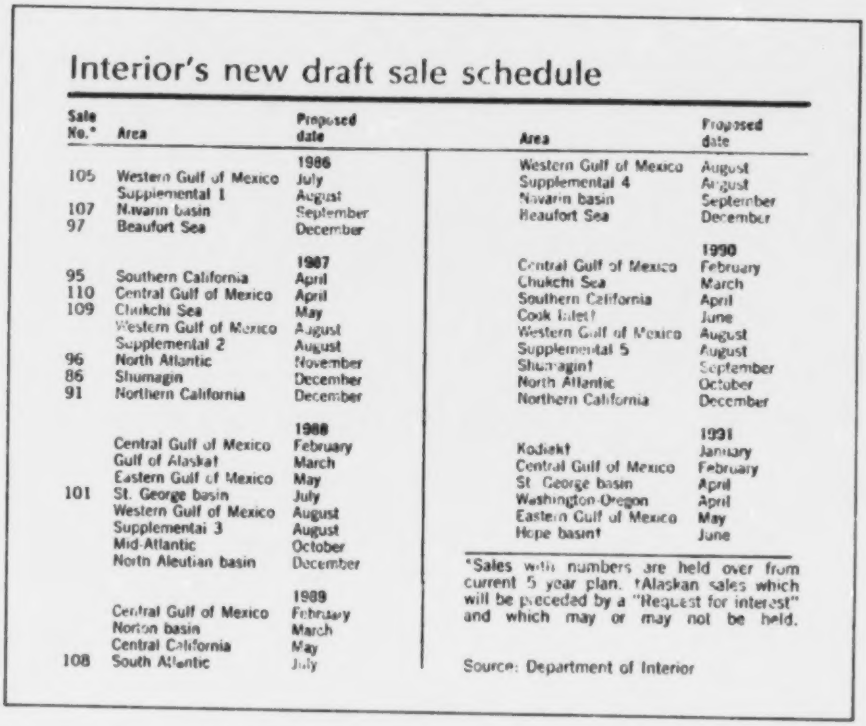

UNITED STATES
DEPARTMENT OF
THE INTERIOR
MINERALS MANAGEMENT SERVICE (OCS)
1985 OFFERINGS
89 ST. GEORGE BASIN SEPTEMBER
92 N. ALEUTIAN BASIN DECEMBER
100 NORTON BASIN DECEMBER
1986 OFFERINGS
107 NAVARIN BASIN MARCH
97 DIAPIR FIELD DECEMBER
1987 OFFERINGS
99 KODIAK FEBRUARY
109 BARROW ARCH FEBRUARY
101 ST. GEORGE BASIN APRIL
86 SHUMAGIN JUNE
BUREAU OF LAND MANAGEMENT
1985 OFFERINGS ▭
STEESE/WHITE MOUNTAIN, SEPTEMBER
ANVIK/BONSILA, VENETIE,
CENTRAL YUKON
851 N.P.R.A. 2MM. ACRES AUGUST
ALASKA
DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF OIL & GAS
1985 SALES ▬
46A COOK INLET FEBRUARY
47 KUPARUK UPLANDS MAY
45A NORTH SLOPE SEPTEMBER
1986 SALES ▭
48 KUPARUK UPLANDS JANUARY
49 COOK INLET MAY
52 BEAUFORT SEA SEPTEMBER
1987 SALES ▬
51 PRUDHOE BAY UPLANDS JANUARY
50 CAMDEN BAY MAY
53 ICY CAPE SEPTEMBER
46 HOLITNA BASIN SEPTEMBER
1988 SALES ▬
54 KUPARUK UPLANDS JANUARY
55 DEMARCATION POINT MAY
56 ALASKA PENINSULA SEPTEMBER
1989 SALES ▬
57 NORTH SLOPE FOOTHILLS JANUARY
45 HOPE BASIN MAY
58 OFFSHORE ICY CAPE SEPTEMBER
SCALE 1:9,750,000
ARCTIC OCEAN
BEAUFORT SEA
CHUKCHI SEA
CHUKCHI PENINSULA
ANADYRSKIY ZALIV
DIAPIR FIELD 97
BARROW ARCH 109
HOPE BASIN
851
52
54
45A
50
55
58
53
48
47
51
57
45
46
49
46A
56
VENETIE
CENTRAL YUKON
WHITE MTN
STEESE
ANVIK BONSILA
CANADA
UNITED STATES
YUKON
ALASKA
USSR
UNITED STATES
NORTON BASIN 100
ST. LAWRENCE ISLAND
ST. MATTHEW HALL
ST. MATTHEW ISLAND
NUNIVAK ISLAND
NAVARIN BASIN 107
ALEUTIAN BASIN
BERING SEA
PRIBILOF ISLANDS
ST. GEORGE BASIN 89,101
BRISTOL BAY
NORTH ALEUTIAN BASIN 92
COOK INLET
KODIAK ISLAND
KODIAK 99
GULF OF ALASKA
GULF OF ALASKA
BOWERS BASIN
ALEUTIAN ISLANDS
SHUMAGIN 86
PACIFIC OCEAN
ALEUTIAN ARC
ALASKA OIL & GAS LEASING PROGRAM
KAY BROWN, DIRECTOR DIV. OIL & GAS
Compiled by W.R. HANSON

FIGURE 2.1.1



Interior's new draft sale schedule

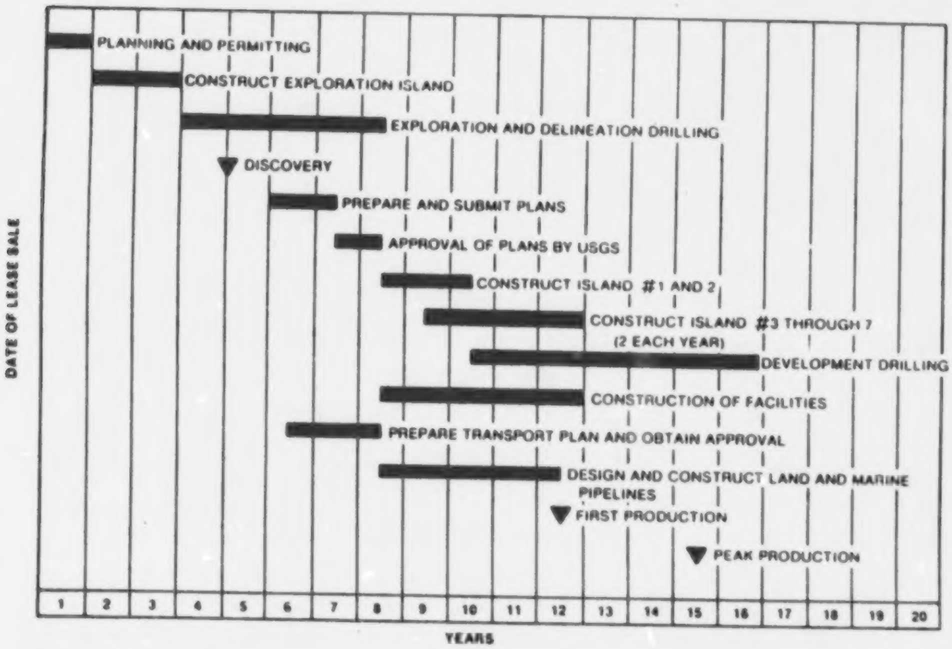
Sale No.*	Area	Proposed date
		1986
105	Western Gulf of Mexico	July
	Supplemental 1	August
107	Navarin basin	September
97	Beaufort Sea	December
		1987
95	Southern California	April
110	Central Gulf of Mexico	April
109	Chukchi Sea	May
	Western Gulf of Mexico	August
	Supplemental 2	August
96	North Atlantic	November
86	Shumagin	December
91	Northern California	December
		1988
	Central Gulf of Mexico	February
	Gulf of Alaska†	March
	Eastern Gulf of Mexico	May
101	St. George basin	July
	Western Gulf of Mexico	August
	Supplemental 3	August
	Mid-Atlantic	October
	North Aleutian basin	December
		1989
	Central Gulf of Mexico	February
	Norton basin	March
	Central California	May
108	South Atlantic	July
	Western Gulf of Mexico	August
	Supplemental 4	August
	Navarin basin	September
	Beaufort Sea	December
		1990
	Central Gulf of Mexico	February
	Chukchi Sea	March
	Southern California	April
	Cook Inlet†	June
	Western Gulf of Mexico	August
	Supplemental 5	August
	Shumagin†	September
	North Atlantic	October
	Northern California	December
		1991
	Kodiak†	January
	Central Gulf of Mexico	February
	St. George basin	April
	Washington-Oregon	April
	Eastern Gulf of Mexico	May
	Hope basin†	June

*Sales with numbers are held over from current 5 year plan. †Alaskan sales which will be preceded by a "Request for interest" and which may or may not be held.

Source: Department of Interior

FIGURE 2.1.2 (Extract from Oil & Gas magazine, March 1985)

BEAUFORT SHELF (OIL CASE – 600,000 BARRELS PER DAY) DEVELOPMENT SCENARIO



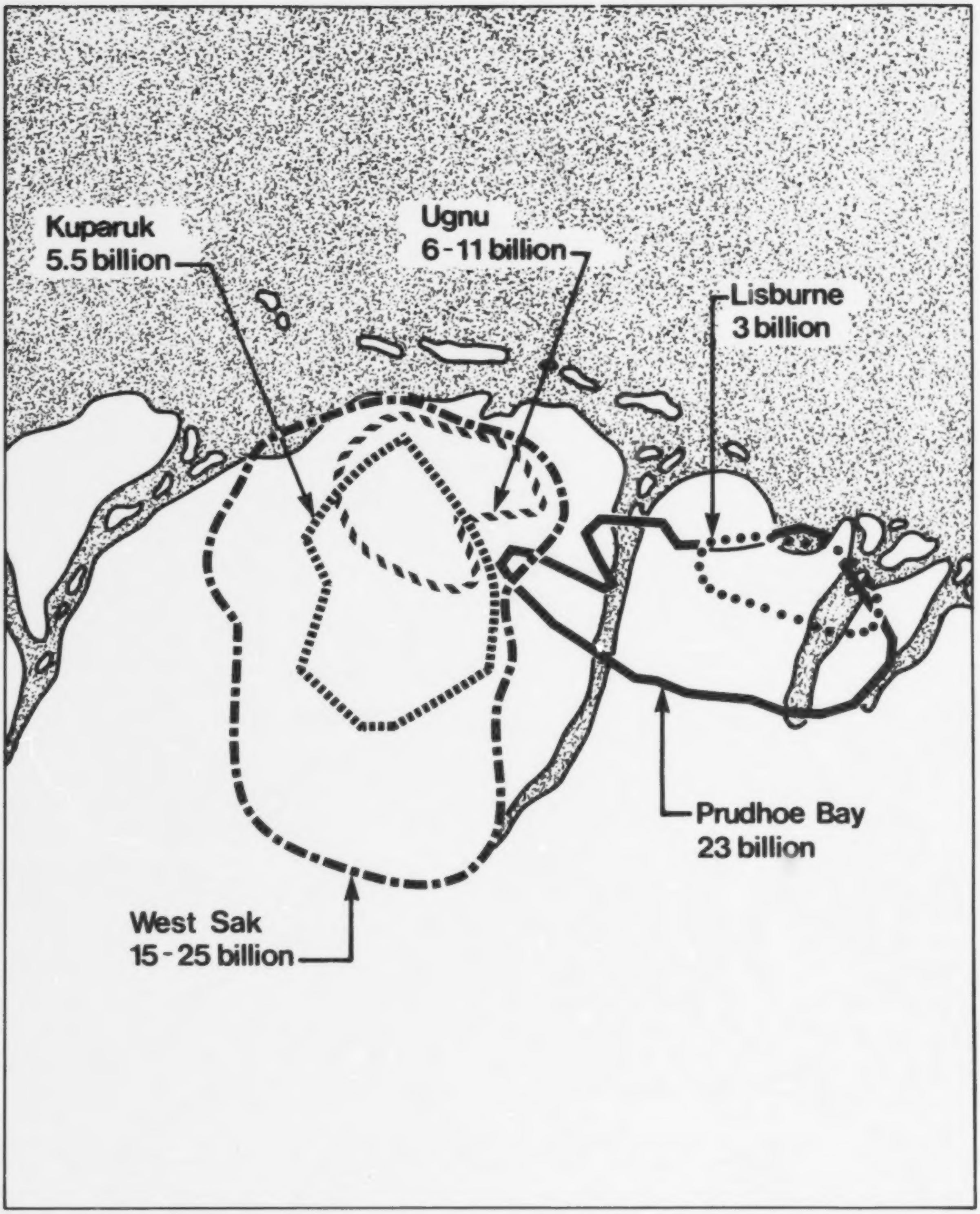
Source: U.S. Arctic Oil and Gas, National Petroleum Council, December 1981

FIGURE 2.1.3

Location	Company	Activity	Remarks
Navarin Basin	Exxon Arco Amoco	Exploration Drilling " "	From semi-sub
Norton Sound	Exxon Arco	Permitted for 2 more exp. wells.	
St. George Basin	Exxon Chevron Mobil Arco Shell Gulf Placid Marathon	Marathom & Placid to start drilling	7 wells completed to date. No results announced.
Alaska Peninsula (Becharof Lake)	Amoco	Plugged and abandoned.	
Shelikof Strait	Chevron	Plugged & abandoned.	
Cook Inlet	Chevron Arco Alaskan Crude Corp.	Chevron plugged and abandoned Anchor Pt. well. Arco drilling third of a 3-well program.	
" "	Marathon	Marathon to start construction of Steelhead platform late 1985. Production start in 1987 at 160 mcfd.	Recoverable reserves of 600 - 800 billion c.f. gas.
" "	Chevron	Beluga River - 4 to 8 mcfd delivery to Enstar began 1984. Development involves 2 to 3 wells per year. Swanson River - miscible injection started 1984 extending field into 1990's.	Current production is 6 to 7,000 b/d.
	Arco	Recently awarded a contact to Fluor to design systems for upgrading gas compression facilities or existing King Salmon Platform.	
Refineries	Tesoro	Refinery expansion undeway to be completed 1985 upgrading from 46,000 to 80,000 b/d.	
"	Mapco	$60 million expansion will double capacity to 90,000 b/d.	Capability to produce ashphalt and motor gasoline will also be added.
	Arco/CIRI	Seeking market in Orient to justify $500 million LNG plant in the North Kenai.	7.5 million T.P.Y. capacity.
	Yukon Pacific Corp.	Studing 820 mile gas pipeline, LNG plant and tanker loading facility at North Kenai.	May follow TAPS routing.
Middle Tanana Basin	Arco	None.	Second well completed in this basin as a strategic test well.
Prudhoe Bay Area			
. Lisburne - below and NE of Prudhoe Bay	Arco	180 wells planned Production to begin 1986.	Peak production expected in 1991 at at 117,000 b/d
. Endicott - NE of Prudhoe Bay	Sohio	120 wells planned Production in 1989 at 100,000 b/d.	
. West Sak Overlying Kuparuk reservoir.	Arco	15 to 45 wells planned. Experimenting with hot-water injection recovery.	Much colder oil near surface. Peak production 1991 at 170,000 b/d
. Milne Point on the coast, North of Kuparuk	Conoco	Drilling 2 development wells. Production start in 1986 peaking at 32,000 b/d in 1987.	Pipeline is complete, production modules to be installed soon.
. Seal Island 6 miles offshore, north of Prudhoe Bay	Shell/ Amerada Hess	Currently drilling wells to define the reservoir.	First major discovery in Alaska OCS. Production start expected by 1995 peaking at around 100,000 b/d in 1996.
. Kuparuk	Arco	113 wells planned with peak production of 265,000 b/d expected.	
. Prudhoe Bay	Arco	30 wells planned for water flood and 200 wells for water miscible gas flood program.	Project expected to recover additional 1.15 billion bbls.

SUMMARY OF PRINCIPAL ACTIVITIES ALASKA & ALASKA OCS JUNE 1985

FIGURE 2.1.4


Kuparuk
5.5 billion
Ugnu
6 - 11 billion
Lisburne
3 billion
Prudhoe Bay
23 billion
West Sak
15 - 25 billion

North Siope - Known Reserves in Place

FIGURE 2.3.1

ESTIMATE OF OIL RESERVES IN ALASKA

OIL FIELD	Reserves* (MM STB) January 1, 1985
Beaver Creek	1
Granite Point	25
Endicott	375
Kuparuk River	1,480
McArthur River	58
Middle Ground Shoal	14
Prudhoe Bay Oil Pool, Lisburne	210
Prudhoe Bay, Prudhoe Oil Pool	5,812
Swanson River	18
Trading Bay	2
TOTAL	7,995

Alaskan oil reserves increased significantly during 1984. The Kuparuk River Field added significant reserves with the addition of a waterflood. Two new fields, Endicott and Lisburne, were committed for development. Lisburne may start production as early as 1986. Endicott is scheduled for startup in late 1987 or early 1988.

In all, these developments boosted oil reserves by more than one billion barrels.

* Reserve is defined as petroleum or natural gas discovered, defined and producible, but not yet produced.

ESTIMATE OF GAS RESERVES IN ALASKA

Reserves* (BSCF)
January 1, 1985

Non-Associated Gas by Field	
Beaver Creek	221
Beluga River	676
East Barrow	10
Kenai	751
Lewis River	21
McArthur River	600
North Cook Inlet	812
South Barrow	9
Sterling	23
Trading Bay	29
West Fork	6
Total	3,158

Associated Gas by Field	
Beaver Creek	1
Granite Point	18
Endicott	731
Kuparuk River	1,480
McArthur River	29
Middle Ground Shoal	9
Prudhoe Bay, Lisburne Oil Pool	800
Prudhoe Bay, Prudhoe Oil Pool	28,500
Swanson River	259
Trading Bay	2
Total	31,829

Shut-in Gas by Field	
Birch Hill	11
Falls Creek	13
Ivan River	26
Nicolai Creek	3
North Fork	12
West Foreland	20
Total	85

Alaskan gas reserves are up to 35 trillion standard cubic feet. Majority of the gas is still contained in the Prudhoe Bay Field. The advent of the Kuparuk River Waterflood and the commitment by operators to develop the Endicott and Lisburne fields added over two trillion cubic feet to Alaska gas reserves.

In the Cook Inlet area, operators of the Trading Bay Unit have committed to placing a new platform for the development of the Crayling Sands above the McArthur River Field. They estimate reserves of 600 billion cubic feet.

FIGURE 2.3.2

DRILLING PERMITS AND DRILLING ACTIVITY*

EXPLORATORY WELLS

Drilling Permits Issued

Province	1980	1981	1982	1983	1984
Alaska Peninsula, SE	0	1	0	0	0
Arctic Foothills	1	1	0	0	0
Arctic Slope	16	12	10	8	15
Bristol Bay Basin	0	0	0	0	1
Cook Inlet Basin	5	4	6	1	6
Copper River Basin	1	0	0	0	0
Middle Tanana Basin	0	0	0	0	1
Totals	23	18	16	9	23

Results of Exploratory Drilling, 1984

Province	Active Wells	Drilling	Oil	Gas	Susp.	P&A	Footage Drilled
Arctic Slope	13	2	-	-	2	9	119,054
Bristol Bay Basin	1	1	-	-	-	-	9,023
Cook Inlet Basin	4	1	-	-	-	3	45,061
Middle Tanana Basin	1	-	-	-	-	1	3,590
Totals	19	4	0	0	2	13	176,728

DEVELOPMENTAL AND SERVICE WELLS

Drilling Permits Issued

Province	1980	1981	1982	1983	1984
Arctic Slope	109	152	190	171	209
Cook Inlet Basin	17	18	13	9	16
Totals	126	170	203	180	225

Results of Developmental and Service Drilling by Field, 1984

Field	Active Wells	Drilling	Oil	Gas	Serv.	Susp.	P&A	Footage Drilled
Beluga River	1	1	-	-	-	-	-	6,665
Kenai	1	1	-	-	-	-	-	8,232
Kuparuk River	154	6	112	-	5	25	6	1,003,370
McArthur River	2	2	-	-	-	-	-	12,532
Middle Ground Shoal	6	1	5	-	-	-	-	33,120
Prudhoe Bay	55	3	39	-	8	5	-	553,392
Swanson River	1	-	1	-	-	-	-	948
Totals	220	14	157	0	13	30	6	1,618,259

TOTAL PERMITS ISSUED IN 1984	248
TOTAL WELLS ACTIVE IN 1984	239
TOTAL FOOTAGE DRILLED IN 1984	1,794,987

* Does not include OCS, nor NPRA prior to 1982.

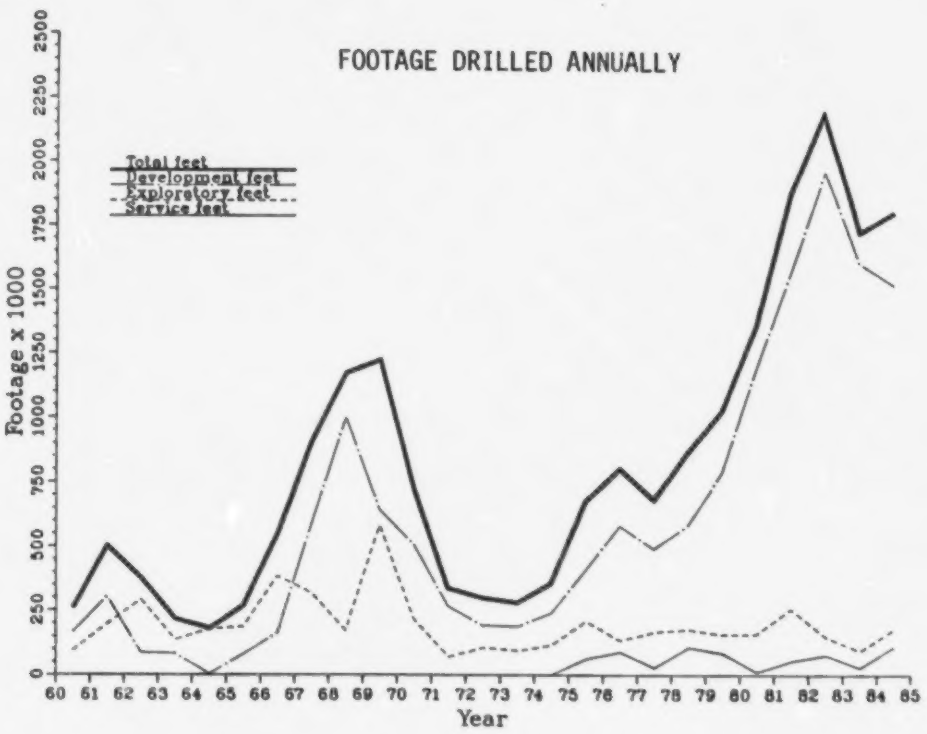


Figure 2.4.1

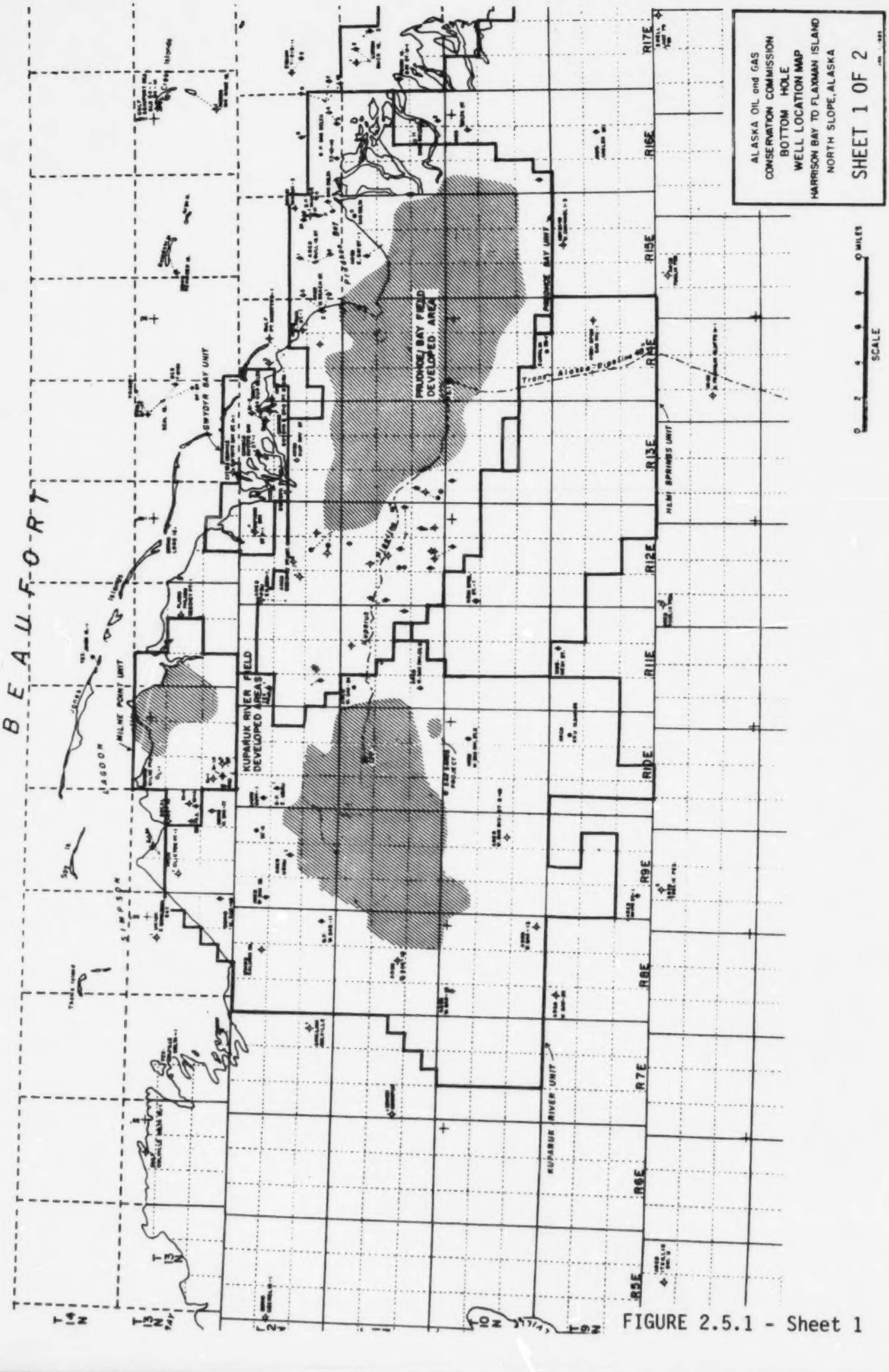

ALASKA OIL and GAS
CONSERVATION COMMISSION
BOTTOM HOLE
WELL LOCATION MAP
HARRISON BAY TO FLAXMAN ISLAND
NORTH SLOPE, ALASKA
SHEET 1 OF 2
BEAUFORT
SIMPSON
LAGOON
MILNE POINT UNIT
KUPARUK RIVER FIELD DEVELOPED AREAS
PRUDHOE BAY FIELD DEVELOPED AREA
PRUDHOE BAY UNIT
GWYDYR BAY UNIT
KUPARUK RIVER UNIT
KEMIK SPRINGS UNIT
Trans Alaska Pipeline
SCALE
0 MILES
R5E
R6E
R7E
R8E
R9E
R10E
R11E
R12E
R13E
R14E
R15E
R16E
R17E
T 14 N
T 13 N
T 12 N
T 11 N
T 10 N
T 9 N

FIGURE 2.5.1 - Sheet 1

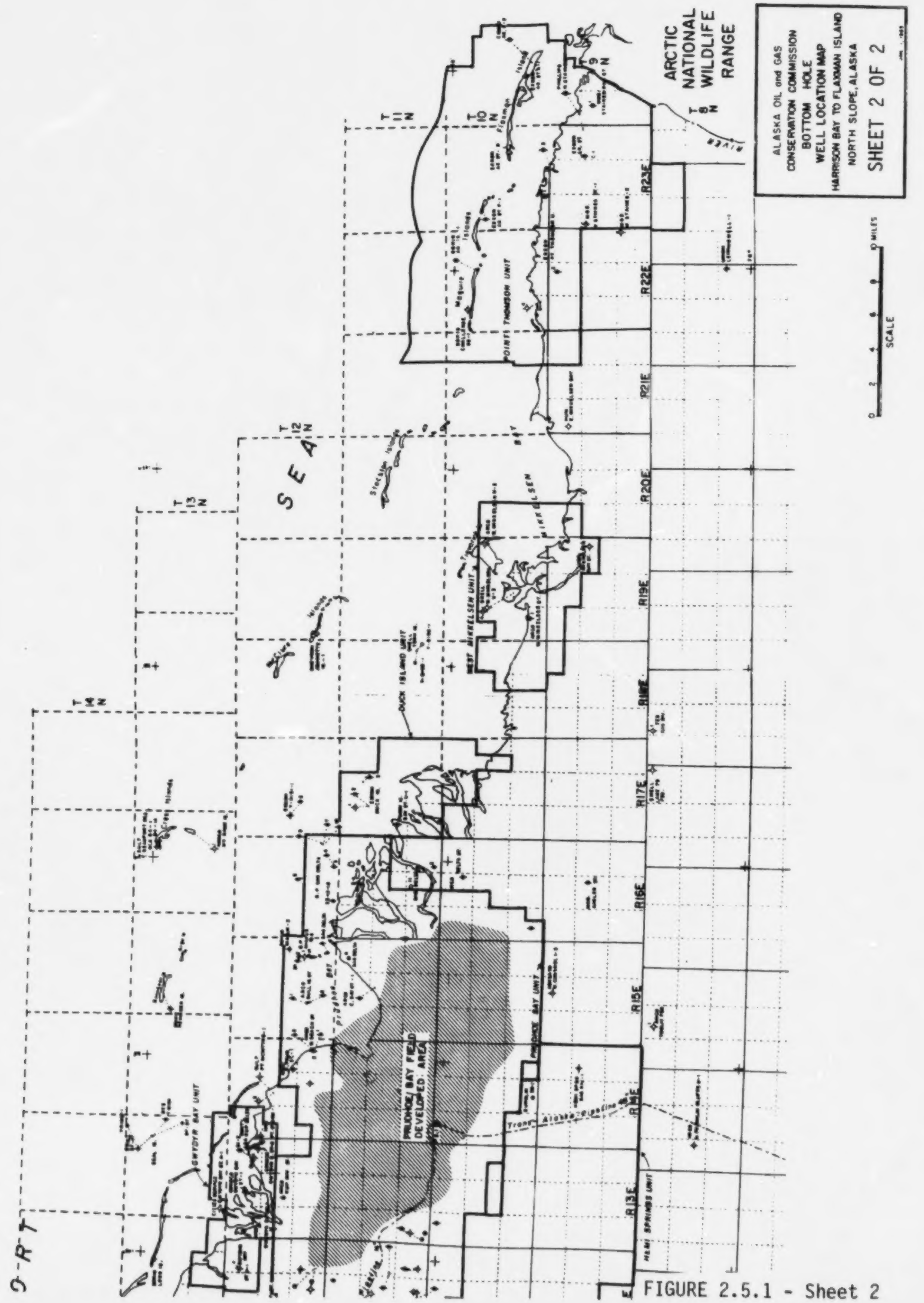

ALASKA OIL and GAS
CONSERVATION COMMISSION
BOTTOM HOLE
WELL LOCATION MAP
HARRISON BAY TO FLAXMAN ISLAND
NORTH SLOPE, ALASKA
SHEET 2 OF 2
ARCTIC NATIONAL WILDLIFE RANGE
SEA
PRUDHOE BAY FIELD DEVELOPED AREA
PRUDHOE BAY UNIT
KUPARUK RIVER UNIT
DUCK ISLAND UNIT
WEST MIKKELSEN UNIT
POINT THOMSON UNIT
KEMIK SPRINGS UNIT
Trans Alaska Pipeline
Flaxman Island
Stockton Islands
MIKKELSEN BAY
R13E
R14E
R15E
R16E
R17E
R18E
R19E
R20E
R21E
R22E
R23E
T 8 N
T 9 N
T 10 N
T 11 N
T 12 N
T 13 N
T 14 N
SCALE
0 2 4 6 8 10 MILES
0-R-T

FIGURE 2.5.1 - Sheet 2

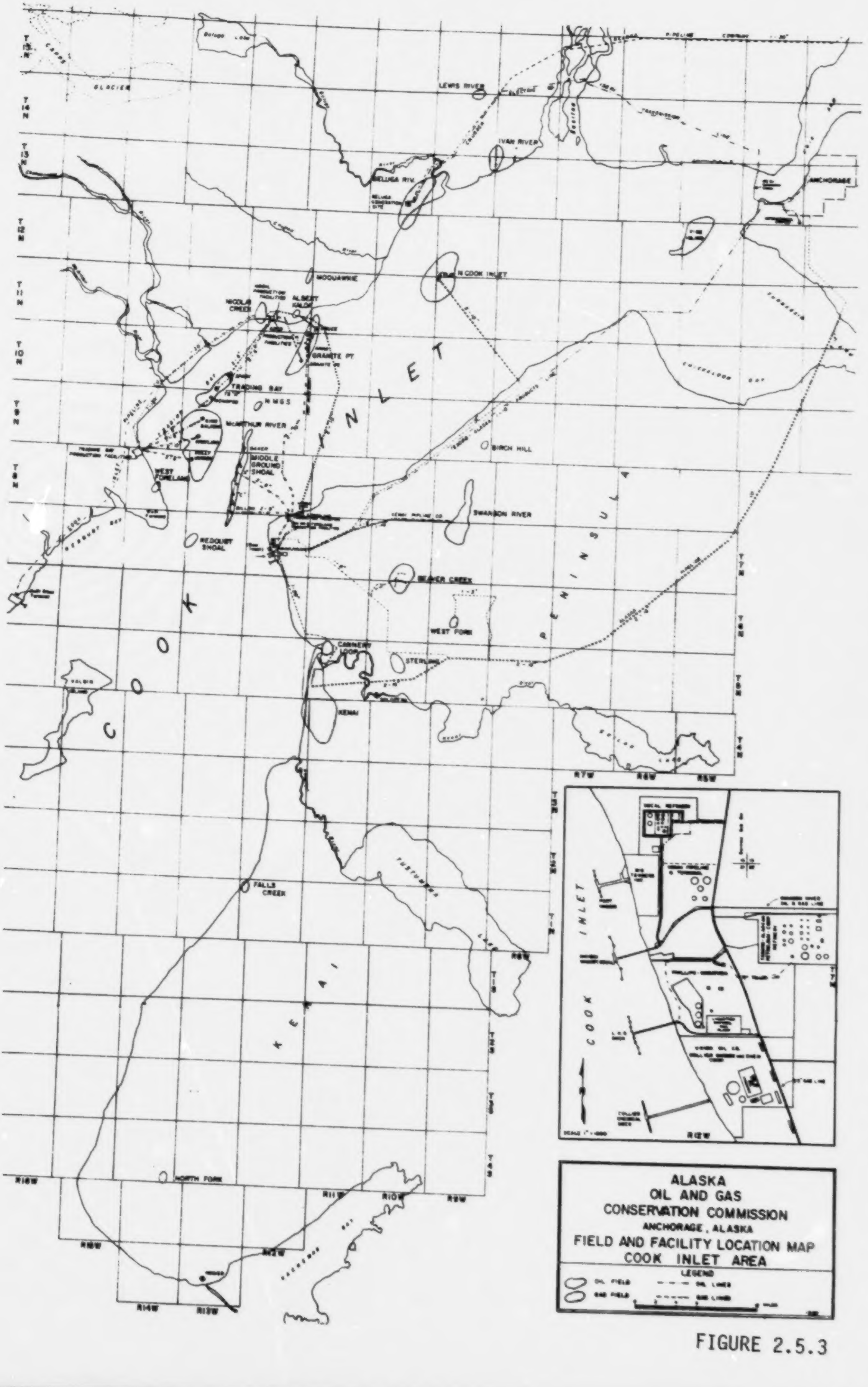

ALASKA
OIL AND GAS
CONSERVATION COMMISSION
ANCHORAGE, ALASKA
FIELD AND FACILITY LOCATION MAP
COOK INLET AREA
LEGEND
OIL FIELD
GAS FIELD
OIL LINES
GAS LINES
GLACIER
LEWIS RIVER
IVAN RIVER
BELUGA RIV.
ANCHORAGE
MOQUAWKIE
N. COOK INLET
NICOLAI CREEK
ALBERT KALOA
GRANITE PT
TRADING BAY
N.M.G.S.
McARTHUR RIVER
MIDDLE GROUND SHOAL
WEST FORELAND
REDOUBT SHOAL
BIRCH HILL
SWANSON RIVER
BEAVER CREEK
WEST FORK
CANNERY LOOP
STERLING
KENAI
FALLS CREEK
NORTH FORK
COOK INLET
KENAI PENINSULA
T 15 N
T 14 N
T 13 N
T 12 N
T 11 N
T 10 N
T 9 N
T 8 N
T 7 N
T 6 N
T 5 N
T 4 N
R7W
R6W
R5W
R12W
R16W
R11W
R10W
R9W
R15W
R14W
R13W
R12W

FIGURE 2.5.3

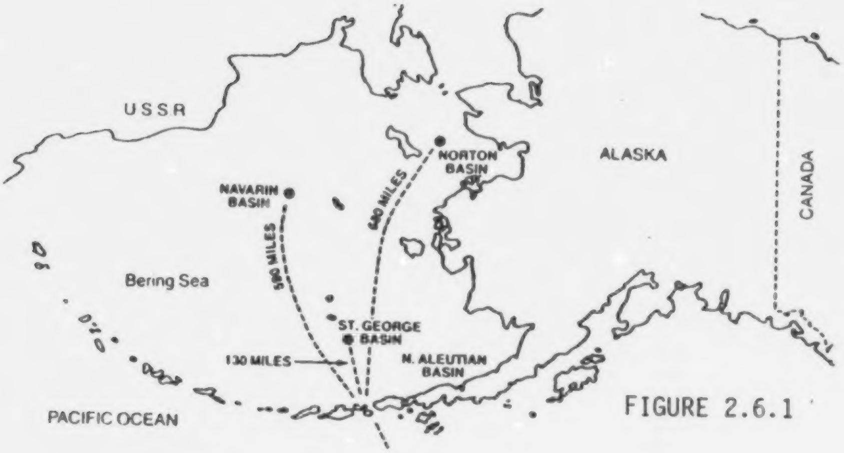

USSR
ALASKA
CANADA
NORTON BASIN
NAVARIN BASIN
640 MILES
590 MILES
Bering Sea
ST. GEORGE BASIN
130 MILES
N. ALEUTIAN BASIN
PACIFIC OCEAN

FIGURE 2.6.1

STATE OF ALASKA - PETROLEUM PROCESSING PLANTS

1984

REFINERY	PLANT CAPACITY	DATE PLANT IN OPERATION	DATE EXPANSIONS	PLANT PRODUCT	DESTINATION
NIKISKI					
Chevron Refinery	18,000 BPD	1962	1983 Asphalt capacity increased from 280,000 to 400,000 BPY.	JP4, Jet A, Furnance Oil, Diesels, Fuel Oil, Asphalt, Unfinished Gasoline.	JP4, JA50, Furnance Oil, Diesels and Asphalt for Alaska; Unfinished Gasoline, High Sulfur Fuel oil to Lower-48 states.
Tesoro Refinery	48,500 BPD; Crude Unit to 80,000 BPD in 1985 for No. Slope Crude. Hydrocracker to 9000 BPD. 14.5 TPD Sulfur Plant.	1969 (17,500 BPD)	1974,1975,1977,1980, 1984 Hydrocracker 9000 BPD, Reformer (to 10,000 BPD from 6000 BPD).	Propane, Unleaded, Regular, and Premimum Gasoline, Jet A, Diesel Fuel, No.2 Diesel, JP4 and No.6 Fuel Oil.	Alaska except No.6 Fuel Oil to Lower-48 states.
Phillips-Marathon LNG	230,000 MCF/Day	1969		Liquified Natural Gas.	Japan, by tanker, 2 tankers capacity 71,500 cu.m. each, avg. one ship every 9 days.
Union Chemical	Ammonia 1,100,000 tons/yr. Urea 1,000,000 tons/yr.	1969	1977	Anhydrous Ammonia, Urea Prills and Granules.	West Coast and export by tanker and bulk freighter.
Pacific Alaska LNG	200,000 MCF/Day initial 400,000 MCF/Day (2nd yr).	Planned 1991		Liquified Natural Gas.	California one ship every 13 days, initial phase.
INTERIOR ALASKA					
North Pole Refinery	46,600 BPD; 90,000 BPD in 1985 for asphalt, leaded and unleaded gasoline, diesel and heating fuels, jet fuels.	1977	Fall 1980; Naptha Stabilizer Column 11,000 BBL, charge capacitiy, crude oil increased from 25,000 to 45,000 BPD. 1985 Asphalt capacity 2300 BPD.	Military Jet Fuel (JP4) 3000-4000 BPD; Commercial Jet A Fuel, 5000-6500 BPD; Diesel Fuel No.1, 1800-2100 BPD; Diesel/Heating Fuel No.2, 1800-2500 BPD, Diesel Fuel No.4, BPD, 2800-3200 BPD, Asphalt 2000-2400 BPD.	Fairbanks area, Nenana and river villages, Eilson AFB, Delta Junction, Tok, Glenallen, and Anchorage area.

FIGURE 2.7.1

TSUSA CLASSIFICATION	COMMODITY GROUPING	TOTAL U.S. IMPORTS (MILLION $)	LEADING COUNTRIES EXPORTING TO U.S. AND VALUE (MILLION $)	
6494935	Rock Drill Bits, Core Bits and Reamers	7.215	Belgium	1.757
			Canada	1.137
			U.K.	1.142
6640810	Drilling or Boring Machine	16.237	Canada	8.383
			Finland	1.594
			U.K.	1.328
6529700	Offshore Oil and Gas Drilling and Production Platforms	11.143	Japan	10.903
			U.K.	0.194
			Other	0.046
6619500	Filter & Purifying Parts (would include desilters and desanders)	113.897	Canada	24.076
			W. Germany	17.435
			Japan	16.083
			U.K.	11.721
6802720	Safety & Relief Valves (including BOPs)	13.117	W. Germany	3.594
			France	3.128
			Japan	2.015
			Canada	0.908

SOURCE: U.S. Bureau of the Census

TABLE 2.10.1

IMPORTS INTO THE U.S. IN 1983 OF SELECTED

OILFIELD AND DRILLING EQUIPMENT

TSUSA CLASSIFICATION	1983 TOTAL	1983 CDN	1983 % CDN	1982 TOTAL	1982 CDN	1982 % CDN	1981 TOTAL	1981 CDN	1981 % CDN	1980 TOTAL	1980 CDN	1980 % CDN
6494935 Rock Drill Bits, Core Bits & Reamers	7215	1137	15.8	6385	1296	20.3	9442	3458	38.6	4923	3517	71.4
6640810 Drilling and Boring Machine	16237	8383	51.6	5809	4958	85.4	261628	20286	7.8	32847	4703	14.3
6529700 Offshore Oil & Gas Drilling & Production Platforms	11142	0	0	2280	447	19.6	16431	0	0	624	80	12.8

SOURCE: U.S. Industrial Outlook
CURRENCY: U.S. '000 Dollars

TABLE 2.10.2

COMPARISON OF CANADIAN VS. TOTAL IMPORTS INTO U.S.A.

Description and Export Commodity Code	1983 Total	1983 U.S.	1982 Total	1982 U.S.	1981 Total	1981 U.S.	1980 Total	1980 U.S.	1979 Total	1979 U.S.	1978 Total	1978 U.S.
Core Drills, Core Drill Bits & Parts 52101	4700	2518 54%	11370	4085 36%	10025	3663 37%	7708	3011 39%	7476	4292 57%	6887	3031 44%
Rock Drills & Parts NES 52104	19700	13100 67%	31446	16940 54%	38163	18899 50%	31967	17371 54%	26481	18434 70%	23124	13750 59%
Rock Drill Bits NES 52119	7400	3300 45%	14336	9060 63%	8075	3600 45%	5752	2333 41%	3355	2237 67%	2393	1056 44%
Earth Drilling & Related Machinery & Parts 52119	14090	28200 20%	210896	116409 55%	355703	289595 81%	94877	71560 75%	45700	30312 66%	54627	44844 82%
Petroleum, Coal and Gas Producing Machinery and Parts 52190	45500	18000 40%	114796	57655 50%	112093	88612 79%	33855	19564 58%	30693	10684 35%	19184	10075 53%
Drilling Rigs and Equipment (Unsold) 99410	14770	366 -	295813	495 -	175380	28 -	N/R		N/R		N/R	

SOURCE: Statistics Canada

Dollar values shown are in '000 of Canadian dollars for the year specified unadjusted for inflation.

N/R - not recorded for those years
NES - not elsewhere specified.

TABLE 2.10 3

CANADIAN EXPORTS OF OILFIELD EQUIPMENT WORLDWIDE
AND TO THE U.S.A.

3. KEY ENTITIES

3.0 KEY ENTITIES

3.1 Preamble

As a general information base on the key entities involved in the Alaska oil and gas industry, it is recommended that potential exporters obtain a copy of the Anchorage Telephone Utility (ATU) phone book.

A copy can be obtained at a cost of U.S. $5.00 (plus postage) from:

. Anchorage Telephone Utility
600 East 38th Avenue
Anchorage, Alaska 99503
(907) 564-1504

Alternate suppliers can be located through local provincial telephone utilities or via directory information services at larger public libraries.

Additionally, and by kind permission of ATU, Appendix 'G' gives a copy extract from the yellow pages of this directory outlining the principal players in the oil industry "Supplies and Services" sector. Should advertising in the ATU phone book be considered useful, this can be organized through Dominion Directory Company Ltd. at (604) 438-5535.

Alaska presents a unique environment for oil and gas development projects and therefore the number of key entities involved is comparatively limited. The key entities are:

- oil companies
- engineering contractors
- module fabricators
- drilling contractors
- service companies
- government agencies
- native corporations

Each is discussed separately in the sections that follow.

For more detailed discussion on contacts and background to the key entities, reference should be made to Section 5 & 6.

3.2 Oil Companies

Alaska is a vast area in which to operate and therefore, in general, only the major oil companies are involved. However recently some small independants have begun to get involved.

Sohio - major interest in Prudhoe and the Beaufort Sea
minor interest in the Bering Sea.

Arco - major interest in Prudhoe, Beaufort Sea, and Bering Sea. Arco have some production from Cook Inlet.

Conoco - Milne Pt. is Conoco's first activity in Alaska. Major interest is the Beaufort Sea.

Exxon - not an operator, nor are they are planning to operate. Aggressively exploring on the North Slope, Beaufort Sea and Bering Sea.

Union - have operations in Cook Inlet and one with Shell and Amoco exploring the Beaufort Sea.

Shell - have increased their activity in Alaska dramatically in the last few years and, with the Seal Island discovery, they could become the fourth operator on the North Slope. They are active in Beaufort Sea and Bering Sea explorations and have some production from the Cook Inlet.

Amerada Hess- recently opened an Anchorage office. They are concentrating their efforts on the Seal Island delineation wells as a part owner with Shell.

Amoco - one of the largest least holders in the OCS in the Beaufort and Bering Seas and are actively exploring both areas.

Texaco - have kept a relatively low profile in exploration but recently announced a find in the Coville Delta which they plan to delineate. Minor interest in the Bering Sea.

Placid, Marathon, Diamond Shamrock, and several others are also involved to varying degrees.

For production development, Sohio, Arco and Conoco are the key entities.

A summary of the purchase decision centres for the main oil companies in Alaska are:

Sohio - Purchases made exclusively in Anchorage.

Sohio Alaska Petroleum Company
900 E Bensen,
Anchorage, Alaska
(907) 561-1511

(for detailed organization chart see Appendix A).

Purchasing requirements on the North Slope are determined by:

Sohio Construction Co.
Pouch 6-612, via N. Slope Pouch
Anchorage, Alaska, 99502

- Maurice Sullivan and
- Jim Rogers at (907) 659-4137

Arco - Purchases made primarily in Anchorage.

Arco Alaska Inc.
P.O. Box 100360
Anchorage, Alaska 99510

- Mr. P. J. Hildebrandt, Director
  (907) 263-4420

See Appendix A for a detailed organization list.

Conoco - Major equipment supplies from Houston are usually arranged as follows:

- wellhead equipment, packers, liners
  - Joe O'Brien, 713-293-1509
- tubulars
  - Dave Long, 713-293-2485

Anchorage procurement (incl. North Slope requirements) is handled by:
- Sam Brown 907-564-7600

Chevron - Small day-to-day items
Sharon Shippy 907-786-6629

Amerada Hess - Rely heavily on design engineering and expertise in Tulsa.

Exxon - Presently rely on Thousand Oaks and Houston offices (Exxon Co. USA 713-656-3008, Exxon Production Research Co. (EPR) 716-965-4222.

Thousand Oaks
- Mr. Cunningham 805-494-2000

Anchorage
- Dick Stapleton 907-561-5331

Houston Exxon USA
- Dick Daming 713-656-3547

Anchorage office
- Manager, Al Herman - 907-561-5361

Union - Union's purchasing department is in Pasadena, California.

Shell Western Purchasing department in Houston
E & P Inc.(713-241-6161)

Mr. Lou Wilkerson
Manager Alaska Technology
713-870-2447

3.3 Engineering Contractors

The engineering contractors involved in Alaska are largely made up of the major U.S. design firms namely:

- R.M. Parsons
  - Headquarters in Pasadena, California
  - Endicott field
    Parson's Purchasing Managers are:
    - Mr. Falkner 818-440-7372
    - Mr. C. Bottitta 818-440-7723
  - Seal Island Project Manager:
    - Larry Cox, 818-440-2789
- Fluor
  - Headquarters in Irvine, California
  - office in Anchorage, General Manager - George Wuerch on 907-276-2636
  - V.P. projects - G. Harold Tseklenis on 714-975-4695
  - Milne Pt. Manager - Ted E. Gazda on 714-975-5687
  - V.P. Alaska (permanent) _ W.C. Breen on 714-975-2222
- Bechtel
  - Headquarters in San Francisco, California
    50 Berle Street
    San Francisco, California
    94105 (415) 768-1234
- Brown and Root
  - Headquarters in Houston, Texas
    4100 Clinton Drive
    Houston, Texas 77020
    on (713) 676-3011

- Stearns Catalytic - Headquarters in Denver, Colorado
  P.O. Box 5888
  Denver, Colorado 80217

- McDermott - Headquarters in New Orleans, Louisiana
  1010 Common St.
  P.O. Box 60035
  New Orleans, Louisiana 70160

Other engineering companies that are involved in Alaskan developments are:

- Swan Wooster Engineering
- Wright Forsen
- Coffman Engineers

3.4 Module Fabricators

To date, most of the module fabrication has been contracted to west coast U.S. companies such as:

- Morrison-Knudson, Boise, Idaho
- Wright-Schuchart-Harbor, Everett, Washington
- Astoria Oilfield Services, Astoria, Oregon
- Pacific Arctic Constructors, Coos Bay, Oregon

Brown and Root, McDermott and Nassco have also made attempts to become involved in module fabrication for Alaska.

3.5 Drilling Contractors

The major drilling contractors involved in onshore drilling are:

- Alaska United Drilling - Anchorage office, 907-561-1265
  4 rigs in Alaska.
- Brinkerhoff Signal - Anchorage office, 907-344-2555
  8 rigs in Alaska
- Doyon Drilling - Anchorage office, 907-278-2631
  1 rig in Alaska
- Nabors Alaska Drilling - Anchorage office, 907-561-4440
  8 rigs in Alaska
- Parker Drilling Co. - Anchorage office, 907-349-1591
  10 rigs in Alaska

- Pool Arctic Drilling - Anchorage office, 907-276-5464
  6 rigs in Alaska
- Roll'n Well Servicing - Anchorage office, 907-561-7458
  2 rigs in Alaska
- Rowan Drilling - Anchorage office, 907-279-2448
  7 rigs in Alaska

The major drilling contractors involved in offshore drilling are:

- Sedco - Dallas 214-720-8700
- Odeco - New Orleans 504-561-2811
- Penrod - Dallas 214-880-1700
- Keydril (subsidiary of Sante Fe Drilling) - Anchorage 907-563-1009
- Rowan Drilling - Houston 713-621-7800
  - Anchorage 907-279-2448

3.6 Supply Houses and Service Companies

The supply houses and service companies in Anchorage are given in the Alaska Telephone Utility extract of oil field supplies and services guide - Appendix 'G'. Further reference and discussion on supply houses is given in Section 6.5.

3.7 Government Agencies

Some of the government agencies involved in onshore and offshore Alaska are:

- Minerals Management Service - regulate OCS lease sales and compliance with OCS orders.

  Minerals Management Service
  Alaska OCS Region
  University Plaza Boulevard
  949 East 36th Avenue
  Anchorage, Alaska 99510
  (907) 261-4010

- U.S. Army - Corps of Engineers - regulates construction activities on and offshore.

  U.S. Corp. of Engineers
  P.O. Box 898
  Anchorage, Alaska 99506-0898
  (907) 753-2838

3.8 Native Corporations

Native corporations were originally formed in 1971 from a total of 214 village corporations to represent the interest of the native people in general. They now operate as 12 main corporations with responsibility for 172 merged village corporations. The native corporations are as follows with Cook Inlet Region Inc. and Sealaska Corp. being amongst the more active:

- Nana Development Corp. Inc.
  4706 Harding Drive, Alaska, 99503
  (907) 248-3030

- Ahtna Development Corp.
  2525 Gambell, Alaska, 99503
  (907) 276-1310

- Aleut Corporation
  Suite 900
  2550 Denali, Alaska, 99503
  (907) 274-1506

- Arctic Slope Regional Corp.
  313 E, Alaska, 99503
  (907) 276-1552

- Calista Corp.
  516 Denali, Alaska, 99501
  (907) 279-5516

- Chugach Alaska Corporation
  3000A, Alaska, 99503
  (907) 563-8866

- Bering Straits Native Corporation
  Box 1008
  Nome, Alaska, 99762
  (907) 443-5252

- Cook Inlet Region Inc. (more active)
  2525C, Alaska, 99501
  (907) 274-8638

- Bristol Bay Native Corp.
  445 E 5th Av., Alaska, 99510
  (907) 278-3602

- Sealaska Corporation (more active)
  Sealaska Plaza
  Juneau, Alaska, 99801
  (907) 586-1512

- Doyan Native Corp.
  201 1st Ave,
  Fairbanks, Alaska, 99701

- Nana Native Corp.
  4706 Harding Drive
  Anchorage, Alaska 99503

The native corporations also operate at municipal/borough level represented by:

- Fairbanks North Star
- Kenai Peninsula
- North Slope
- Bristol Bay
- Juneau
- Matanuska-susitua
- Kodiak Island
- Sitka
- Kodiak Island
- Haynes
- Ketchikan

4. EQUIPMENT AND TECHNOLOGY

4.0 EQUIPMENT AND TECHNOLOGY

4.1 Preamble

The arctic offshore is a region of large contrasts in environmental conditions. The main feature which distinguishes it from other offshore areas is the presence of sea ice. Arctic pack ice in the Beaufort Sea, and annual drift ice in the Bering Sea place constraints on petroleum exploration and development activities. In the Beaufort Sea, the open water or ice free season tends to increase from 2 to 3 months in an easterly direction. Consequently, different technologies are required for the different ice regimes, and the trend is toward even more diversification with each area requiring specialized technology tailored to the particular environment. This diversity has tended to slow the pace of both exploration and development activities compared to other offshore areas where the technology is more standard and readily available. On the other hand, this diversity has stimulated development of numerous new concepts and operating techniques in the search for oil and gas in the arctic frontier.

4.2 Equipment & Materials

Appendix 'D' contains separate lists for drilling equipment and materials and for production equipment and materials.

The drilling equipment listed comprises the rig, auxiliaries and support system for a self-contained, winterized drilling package.

If the drilling system were placed on an offshore fixed or floating structure, it would be require the following additional equipment:

- mooring and towing equipment
- craneage of the pedestal and crawler type
- accommodations
- helideck and helifuel systems
- life support of safety equipment
- potable water units
- ballast systems

The production equipment listed represents the potential items for a self-contained offshore drilling and production platform for 100,000 to 150,000 BOPD as depicted on the flow diagrams given in Appendix 'E'. This gives insight into the extent of production, processing, utility and life support equipment and material required for the Alaskan market. While there are differences among facilities for onshore, artificial islands and offshore platforms, the list is intended to be all inclusive.

4.3 Typical Well Consumables

A typical well program for 15,000 ft total depth is likely to include the following material requirements:

(a) Casing -

Diameter (inches)		Weight (Tons)
30		50
20		140
13 3/8		270
9 5/8		270
7		110
4 1/2		30
	Total	870 tons

(b) Mud - 700 tons

(c) Barite - 5,000 tons

(d) Cement - 550 tons

(e) Drill pipe -

Diameter (inches)	Length (feet)
5	17,500
3 1/2	10,000
5 (high pressure)	900

(f) Drill collars -

Diameter (inches)	Quantity
11	3
9	12
6 3/4	30
4 3/4	30

(g) Tubing Test String

Diameter (inches)	Length (feet)
3 1/2	17,500

(h) Fuel for Rig & Auxiliary Power only:

. maximum consumption = 3,000 gallons daily

(i) May include up to 15,000 ft of 2 1/2 " (or larger) tubing for completing a development well

4.4 Standards and Regulations

4.4.1 Equipment

(a) Mechanical Standards

In most cases, mechanical equipment manufactured in Canada is fabricated to meet American Petroleum Institute (API) standards and therefore poses no problems with acceptance by American purchasers. In favour of the Canadian equipment manufacturer is a reputation for rugged design which has evolved as a result of the severe climatic conditions encountered in Canada.

The piping and pressure vessels associated with the above equipment are also manufactured in Canada to American standards. The American National Standards Institute (ANSI), the American Society for Mechanical Engineers (ASME) and the American Society for Testing and Materials (ASTM) are standards generally met by Canadian manufacturers. Consequently there is little concern for Canadian manufactured mechanical equipment meeting American requirements.

The above codes are traditionally used in oil and gas exploration and production and provide no implications unfamiliar to a competent Canadian oilfield supplier.

(b) Electrical Standards

There are several certification authorities in the U.S. for electrical equipment. Underwriters Laboratory International (U.L. or U.L.I.) is the most widely recognized organization followed by Factory Mutual (FM) who deal with more specialized explosion proof equipment. Other organizations such as Electrical Testing Laboratory (ETL) are relatively new by comparison but appear to be growing rapidly.

Because U.L. certification is readily accepted by most organizations, Canadian manufacturers should confirm with potential U.S. purchasers if this is a minimum requirement. However, it should be recognized that U.L. approval will increase the marketability of a product in Alaska. The procedure to obtain U.L. approval is:

- write to U.L. requesting general information and table initial enquiry
- U.L. can send their standards for perusal prior to submission
- send detailed description of equipment to U.L.
- U.L. will provide a cost and time estimate for testing and approval. This is typically $10,000 and 12 weeks
- send equipment for testing

- U.L. tests in their laboratory

It should be noted that the cost is for one test only and does not guarantee approval. U.L. will consider test reults from C.S.A. although U.L. can be more stringent for explosion proof equipment.

U.L. has four testing laboratories in the U.S.: New York - New York, Tampa - Florida, Santa Clara - California and Northbrook - Illinois. The Northbrook office specializes in testing equipment destined for hazardous locations.

The address and contacts of interest are:

Underwriters Laboratories
1655 Scott Boulevard
Sant Clar, Calif. 95050

Client Advisor: Wanda Holland
(408) 985-2400

333 Pfingsten Road
Northbrook, Illinois 60062

Client Advisor: Al Bartkus
(312) 272-8800

(c) CSA Standards

If CSA approvals alone are not supported by UL (Underwriters Laboratory) or FM (Factory Mutual), there is considerably less chance of purchase by an Alaskan operator. This is because the Owner's specifications call for UL or FM as a standard requirement. As an example, non-U.S. suppliers of electrical gas detection equipment find it almost impossible to compete in the Alaska market without UL approval even though the equipment has performed well in arduous circumstances such as the North Sea facilities.

4.4.2 Structures and Facilities

The following codes are particularly relevant to structures and facilities for offshore exploration and development. Concrete codes are included for their application to existing and future, drilling and production structures:

ABS	Rules for Building & Classing Mobile Offshore Drilling Units
ABS	Rules for Building & Classing Offshore Installations
AISC	Specification for the Design, Fabrication & Erection of Structural Steel
API RP 2A	Recommended Practice for Planning, Designing & Constructing Fixed Offshore Platforms
API 2C	Specification for Offshore Cranes

API RP 2L	Recommended Practice for Planning, Designing & Constructing Heliports for Fixed Offshore Platforms
API RP 2N	Recommended Practice for Planning, Designing & Constructing Fixed Offshore Structures in Ice Environments
API RP 500B	Recommended Practice for Classification of Areas for Electrical Installations at Drilling Rigs & Production Facilities On Land & On Marine Fixed & Mobile Platforms
AWS D1.1	Structural Welding Code
DnV	Rules for the Design, Construction & Inspection Of Offshore Structures
IMCO	Code for the Construction & Equipment of Mobile Offshore Drilling Units
MMS	Outer Continental Shelf Orders - Alaska
USCG	Requirements for Mobile Offshore Drilling Units
NACE (RP-01)	Control of Corrosion on Steel, Fixed Offshore Platforms Associated With Petroleum Production
ACI 318	Building Code Requirements for Reinforced Concrete
ACI 357R	Guide for the Design & Construction of Fixed Offshore Concrete Structures
ACI 201.2R	Guide to Durable Concrete
ACI 304	Recommended Practice for Measuring, Mixing, Tranporting & Placing Concrete
ACI 308	Standard Practice for Curing Concrete
ACI 309	Standard Practice for Consolidation of Concrete
ASTM C33	Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freeze & Thaw
ASTM A706	Specifications for Low Alloy Steel Deformed Bars for Concrete Reinforcement

FIP	Recommendation for the Design & Construction of Concrete Sea Structures

4.4.3 Regulatory Compliance

Onshore facilities comply with tranditional codes and regulations (API, ANSI, etc.). These are familiar to most American & Canadian oilfield suppliers.

Offshore codes present a more restrictive and uncertain situation with regard to structures and equipment for two reasons:

- There are no precedents set due to the limited number of drilling stuctures and no production structures for offshore Alaska.
- In general, regulatory scrutiny of offshore facilities is more intense than for land based systems. Specifically, the U.S. Department of the Interior - Minerals Management Service branch (M.M.S.) is the primary authority concerned with OCS exploration and development. The M.M.S. studies environmetnal impact, leases offshore tracts and ensures overall compliance with structural and code requirements. In addition the U.S. Coast Guard (USCG) monitors requirements for Mobile Offshore Drilling Units.

The M.M.S. does not recommend equipment or have "approved" equipment lists but has power of rejection on any equipment deemed unsafe.

M.M.S. procedures require that a Certified Verification Agent (CVA) be appointed to classify offshore vessels and verify structural and code compliance. There are a large number of CVA's in both Canada and the U.S.A. who are specifically approved for such work.

Additional regulatory authorities sometimes involved in platform certification include:

: Environmental Protection Agency (Local Borough)
: U.S. Army Corp. of Engineering
: Coastal Zone Complicance

4.5 Support & Miscellaneous Vessels

There is a growing role for ice-capable support vessels.

Six Class 4 icebreakers, and a number of smaller ice-capable support vessels, are in service in the Canadian Beaufort Sea. These are the only privately owned commercial icebreakers in the world. They have had an important impact on marine capabilities and operator confidence in conducting a wide range of summer open water operations: dredging and island construction, anchor handling and ice management for floating drilling, late-season rig moves, resupply, and towing of major structures such as CIDS or Molikpaq.

The need for icebreaker support in the U.S. Beaufort is likely to increase as exploration drilling is pushed into deeper waters, to support either floating drilling operations or the towing and resupply of MODU's in broken ice. There are no major ice- breaking vessels in the U.S. Beaufort Sea.

If oil is found in the central or northern Bering Sea, year-round production operations would likely require a dedicated fleet of icebreakers for platform resupply, ice management at terminals, and tanker escorts.

The investment and operating cost for icebreaking supply vessels can be very significant. For instance, Canadian operators have used up to four icebreaking support vessels, with a combined total of over 500,000 horsepower, for ice management and anchor handling around a floating drilling vessel. The cost of such a support fleet could exceed that of the drilling vessel itself.

For general marine transportation activities in the Beaufort Sea, the following vessels are typical of those in use:

- Ice Class Tugs,
- Pusher Tugs, (emphasis on design for shallow water and
- Barges ice navigation)

Typical marine services required of such vessels include:

- Offshore construction,
- Rig moves,
- Vessel anchoring and positioning,
- Ice management
- Support for seismic and survey work
- Support for salvage operation
- Cargo transportation related to both the oil and construction industries.

In respect of Canadian vessel deployment, it should be noted that the Jones Act may inhibit foreign built vessels from carrying cargo in U.S. waters between U.S. ports. This will also be dependent on availability of suitable vessels for the work required. It should also be noted that the Jones Act, in general, does not inhibit Canadian vessels shipping from Canadian ports to U.S. destinations. Exporters are advised to check their particular requirements in detail. Further reference to the Jones Act is made in Section 2.11.

4.6 Existing Technology and Opportunities

Canadian vendors, fabricators and contractors have a strong, established industrial base of good appeal to the Alaskan Oil & Gas industry. The technology required now or in the foreseeable future by Alaskan operators may be described in general, as:

(a) General know-how and familiarity with basic oilfield equipment and materials. The products manufactured, fabricated and supplied for the Canadian oil industry are basically the same as required for Alaskan production and transportation.

(b) General know-how and familiarity with gas processing equipment and materials. While the handling of sour gas containing hydrogen sulphide is not a concern for Alaska Gas Production, the technolgoy associated with it in Western Canada has raised the Canadian gas processing industry to world standards in such matters as processing, metallurgy, corrosion, and safety.

(c) Cold weather operational experience derived from involvement with northern oil & gas operations, particularly in Alberta & northwest B.C. which has resulted in the capability to build, operate and live successfuly in cold and isolated environments. This has been developed to the point that the Canadian oil and gas industry is familiar with those facilities which remain exposed to the elements and still operate successfully by employing varying degrees of insulation, cladding, housing and/or heating.

(d) Enhanced oil recovery systems. The Prudhoe Bay fields operated by Sohio & Arco are suffering production declines. Gas injection and water injection systems have been installed to halt the decline, increase ultimate reserve recoveries and, in the case of gas injection, temporarily dispose of the gas. These secondary recovery methods along with more exotic tertiary recovery methods such as carbon dioxide floods, miscible fluid injections, surfactant floods, etc. are all techniques researched, developed and implemented in Canadian oil fields.

(e) Heavy oil recovery and production has been pioneered and developed to its greatest extent in Canada, especially in the northern regions of Alberta/Saskatchewan. The processes with related special equipment, materials and systems include:

- steam flooding
- hot water flooding
- air injection and in-situ combustion
- upgrading and dilutent addition
- separation, pumping and handling of heavy oils

In Alaska, heavy oil experience is particularly relevant to Arco's West Sak Reservoir. Arco are currently installing a hot water pilot project with possibly a 45 well program. Ultimately, the field may produce as much as 200,000 BOPD.

(f) In the drilling technology sector, Canadians are experienced in designing and building onshore and offshore drilling systems. Canadian are familiar with sophisticated drilling applications such as:

- deep drilling
- deviated drilling
- slant drilling
- offshore (floating) drilling
- sour gas drilling
- high pressure drilling
- zero, or minimal, cuttings disposal
- harsh environment drilling
- rig moves in isolated areas

(g) Ultimately the associated and non-associated gas of the North Slope will be available for sale and distribution. Whether pipelined to the lower 48 or converted to LNG at site or at an intermediate location, Canadian gas technology is applicable.

Although there are no major Canadian LNG plants, the Western Canadian LNG & Arctic LNG projects created a high level of LNG engineering capability in Canada.

4.7 Technology Development

4.7.1 General

The Canadian oil and gas industry has a proven record for innovative thinking and robust design, particularly for the northern environment. This places exporters in an ideal position to respond to the changing needs of the Alaska oil and gas sector. The sections that follow provide only limited suggestion of technology development opportunities and exporters are encouraged to research their own field in a market that provides substantial scope.

To further assist exporters with potential leads on technology development, reference can be made to the following professional/industry publications:

- Offshore Mechanics and Arctic Engineering (OMAE) Division of the American Society of Mechanical Engineers. The proceedings are available from: ASME Order Dept., P.O. Box 3199, Grand Central Station, New York, N.Y. 10163.

These proceedings address the following research topics:

- Arctic Thermal Design and Analysis
- Ice Mechanics and Properties
- Arctic Design and Operations
- Arctic and Offshore Structural Components and Soils
- Ice-Structure Interactions

In addition, other leads on technology development may be obtained from the several publications offered by the Arctic Petroleum Operators Association (APOA). A copy of the APOA reports catalogue is included in Appendix 'K' of this study.

4.7.2 Sub-Sea Pipelines

Since crude oil transportation from the northern environment amounts to some 33% of the cost of recovery, development of sub-sea pipeline technology is considered to be particularly important.

The sub-sea pipeline industry is already actively pursuing the question of optimal strategy for adequate protection of pipelines against damage due to collision with ice keels at a reasonable cost. Opportunity exists for technology development in this area with particular reference to strategies which deal with both the chance and consequence of damage together with the practicability of designing and building such pipelines in the arctic environment.

A recent study carried out for a group of oil and construction companies addressed the environmental and technical issues associated with laying Beaufort Sea pipelines. In many cases, it was considered that conventional sub-marine pipe laying techniques would be of little value in view of the shallow waters and associated ice problems. The primary pipeline technology issues include:

- sea-floor to shore transition
- offshore laying and burial
- stability in permafrost, offshore
- stability in permafrost, onshore
- structural integrity monitoring systems
- damage repair and pollution control

From the environmentalist standpoint, buried pipelines are likely to remain the more favoured solution. Such buried lines, at risk to Beaufort Sea ice scour, will probably call for a worst case design approach and industry has suggested that a reasonable structural monitoring system could make the difference in economics. Some work is already underway using fibre-optics to measure the magnitude and location of strain changes in a structure over long distances. Opportunity therefore exists for development of structural monitoring systems applicable to Beaufort Sea buried pipeline systems.

In view of the cost implications, opportunity exists to consider and develop non-traditional methods of pipelaying in the Beaufort Sea. Not only should such technology address laying and burial procedures, noting the requirements imposed by ice gouging, but also seafloor/shore transitions and onshore/offshore stability in permafrost. As part of the developing,technology, a joint industry project is currently underway for a 1/3 size prototype model for a simultaneous "trench and lay" pipeline operation.

4.7.3 Sustained Drilling Operations

Should the potential of the Alaskan Beaufort be confirmed, there will be a need for a new type of drilling system capable of sustained operation in the arctic pack ice. Industry is now considering the possibility of moving arctic structures in the presence of ice to maximize the usage of a given system in a given year.

This will involve further technology development in the fields of arctic offshore structures, ice management, ice breakers and marine support capabilities.

4.7.4 Near-Shore Transportation

Air cushion vehicles (ACV's) are currently being developed as a means of transportation for equipment and supplies in all weather and ice conditions. Sohio continues with a comprehensive research program and has generated a unique engineering data base to allow prediction of hovercraft resistance over different ice surfaces. Arctic transportation by ACV appears to have a positive future with the logistics of Beaufort Sea offshore production.

4.7.5 Offshore/Storage and Transportation Systems

Should the pending exploration of the Bering Sea, result is commercial oil finds, development of purpose built storage and transportation systems will become particularly important. Reference should be made to Section 2.6.2 for study information on the subject of Bering Sea Crude Oil Transportation Systems.

5. EQUIPMENT PURCHASING CHANNELS AND METHODS

5.0 EQUIPMENT PURCHASING CHANNELS AND METHODS

5.1 Preamble

Equipment purchasing channels and methods vary depending on the type of equipment and the purchaser. In planning a marketing strategy, procurement of equipment should be considered in three broad categories:

- equipment required for exploration drilling,
- equipment required for facility fabrication and,
- equipment required after installation.

Purchases within these groups vary in both nature and time frame. Within these categories the type of equipment can be further subdivided into:

- standard and,
- innovative or new

The activity level during exploration, especially in Alaska where costs are high, is relatively low. Therefore, the quantities of goods and service required is relatively small. However, the activity in development drilling is high, especially in the North Slope.

Equipment and services for installation of a facility are generally purchased within a limited time frame and are usually considered a "one time" purchase. However, in some cases in Alaska, owing to transportation restrictions, several stages of development may be appropriate, each with separate purchasing requirements.

Equipment purchased after installation (to be used for maintenance or operations) is purchased either over the life of the drilling program or the life of platform production. Since much of this equipment involves consumables or will require replacement due to wear, this sector will more likely involve repeat orders.

Figure 5.1.1 gives a schematic representation of supplier opportunities for each of the major areas of development in Alaska.

Standard equipment is generally selected by the purchasing department with the request originating from either the design engineer (equipment fabrication) or the field engineer (equipment installation). A purchasing department's selection is largely based on cost, with some consideration also being given to track record.

New or innovative equipment is usually specified and selected by the engineer with the purchasing group acting in an information gathering capacity only. In this case, the decision to buy is based strongly on engineering technology, with some consideration given to cost.

For the North Slope, as a general statement, the tendency is to purchase, if available, small high wear items locally in Prudhoe Bay, medium sized equipment in Anchorage and major modules in the lower 48.

5.2 Purchasing for Exploration Drilling

For the Alaskan market, equipment is required for exploration drilling in both the onshore and offshore modes, and for exploration and development. The majority of the acitivity in exploration is offshore whereas development drilling is concentrated onshore.

For drilling, whether onshore or offshore from artificial islands or drilling structures, the drilling rig, its auxiliaries and the drilling crew are provided by a drilling contractor on a day rate basis. While the operator may request certain drilling equipment features from the drilling contractor, the drilling system is essentially a package provided by one of a number of U.S. drilling contractors (i.e. Nabors Alaska, Doyon Drilling, Parker, Brinkerhoff, Pool Arctic Alaska, Alaska United, etc.).

A different group of U.S. drilling contractors supply drilling structures, primarily semi-submersible vessels, which are involved in the new activity in the Bering Sea. In this case, the drilling contractor will mobilize his structure complete with rig and support systems from its previous offshore location (i.e. Odeco, Western, Sonat, Global Marine, Sedco, etc.).

Very few new land rigs are currently being constructed for onshore packages or offshore drilling. Any market for drilling goods and services is primarily related to the operating and maintenance of the existing rigs. This is evidenced by the fact that in June '85 only about 50% of the land rigs were contracted out. However, many of the idle rigs are old and due to be retired because of operating inefficiencies. Furthermore, the active contractors (Doyon, Nabors, and Pool Arctic) are considering new construction of mobile land rigs targeted for the development drilling activity on the North Slope.

5.3 Purchasing for Platform Fabrication

In most cases, the design of a platform for Alaska is divided into three basic sections:

- derrick and drilling modules
- topsides
- structure (offshore areas only)

Derrick and Drilling Modules

The derrick and drilling modules are generally designed, built and operated by an independent drilling contractor as in the exploration phase with similar purchasing channels. After the drilling program is complete, the contractor removes his rig. The operating company may replace it with a lighter service rig immediately, or have one brought out as required for workovers. This relieves the operating company of owning drilling equipment that would rarely be used once the drilling program is complete. In this case, the rig equipment specification and purchasing would be handled directly by the drilling contractor. The rig would be built to meet the operating company's general performance requirements with minimal input into purchasing decisions by the operating company. Most new rig construction for the North Slope is done in Canada for deployment in Alaska.

The amount of equipment purchased by the drilling contractor will depend on whether he is building a new rig or modifying an existing rig. Existing land rigs are often modified for use due to the recent low rig activity and subsequent availability of "cheap" equipment. A new rig will be built if there is no available rig which can be economically modified for operations in the Alaska environment; winterizing and mobility being particularly relevant.

Generally, to date, the activity level has not warranted the operating company buying a drilling package. This may be done when further development drilling of a similar nature is planned. The drilling rig and facilities would then be moved from one location to the next upon completion of the first drilling program. Most of the recent development drilling in Alaska has been done using rigs owned and operated by drilling contractors. However, in the early Cook Inlet days the rigs were owned and operated by the operating oil companies. With the trend towards production of heavier crudes on the North Slope, there may be an increased tendency to leave the heavier drilling derrick in place for conversion to a workover rig. This may induce the operator to purchase or lease the derrick and drilling modules.

The decision location for purchases required for development drilling is, in most cases, in the Anchorage office of the operator who selects a drilling contractor. Development drilling purchases then proceed in the manner described previously.

The tendency toward operators strengthing their Anchorage offices is increasing.

Facilities Equipment

The facilities, as discussed here, exclude the drilling rig and support facilities discussed above. Operator involvement in detailed facilities design varies. In the case where a complete design is done by a consultant, the bid list, specifications, quotations and purchasing are handled in the consultant's offices.

A consultant is often retained to prepare equipment specifications and obtain quotations. This work will also extend to technical and commercial review culminating in appropriate recommendations to the operator.

Owing to the more robust nature of much of the equipment and technology for Alaska, the operating companies tend to play a larger role than in other areas. An operating company's technical and/or purchasing agent would be assigned to the consultant's office for input into equipment specifications and for final purchase approval. The consultant, on receipt of company approval, then finalizes the equipment purchase (see Figure 5.3.1).

The bid list for equipment is determined by several considerations. Major oil companies often have approved vendor lists for various types of equipment but these usually apply to standard types of equipment. It should be noted that consultants' recommendations from past experience often carry significant weight in determination of equipment bid lists. These consultants also carry approved vendor lists of their own.

Some operating companies do their own topsides design, including the drilling facilities (i.e. Shell). In this case, there is no well-defined purchasing structure. Design and purchasing will be done through the company project team with input from the regional drilling or production office in Alaska. The project team will most likely be located in company headquarters.

As for all remote areas, there is an economic incentive to package equipment in modules. Due to the high cost of Alaskan labour and the lack of a suitable manufacturing facility in Alaska, most of the module fabrication is performed in the lower 48, and usually in Washington, Oregon and/or California.

There is a general desire for the equipment to be North American-made but with the recent cost advantages and the fact that major equipment manufacturers have licensed Far East firms, this desire is weakening. For offshore installations, Far East yards tend to be the most competitive for structural fabrication work. Such contracts also tend to offer the best composite price leaving N. American equipment suppiers at a disadvantage. For onshore modules, North American yards continue to be competitive and continue to win most contracts.

Equipment purchased by the consultant or company for inclusion in a module is forwarded to the fabrication yard for installation. The fabricator is sometimes required to purchase many of the smaller bulk items necessary for installation of owner furnished equipment. These items would include instrument or hydraulic tubing, piping and valves smaller than 2" diameter, electrical wiring and conduit, nuts and bolts, various instruments etc. These items would be purchased by the fabricator at his expense but will be to operator specifications.

The decisions on major projects, including choice of design engineer and fabricator, are generally made in the southern headquarters of the operator (i.e. Houston, Los Angeles, San Francisco). The design engineer and fabricator select equipment usually via their head offices as described below.

Structure (only for Offshore areas)

A structure per se is required only for the offshore areas. Typical onshore facilities consist of well pad areas (designated as "WP" projects by owners in referring to the design, procurement, fabrication and construction work related to their installation). Well pad areas usually contain between 4 and 16 individual wells in well houses. The wells are combined in the well pad area at the manifold building.

Elevated flowlines with river and caribou crossings pass through valve stations, en route to facilities for separation and treatment at the gathering centers and then to the main pipeline (see Figure 5.3.2).

Both concrete and steel have been used to construct exploration structures offshore Alaska in the Beaufort Sea. Some structures have also been developed which use composite or hybrid systems with the intent of optimizing design economoy in an extremely harsh environment.

Figure 5.3.3 shows a typical Beaufort Sea type structure which resists the large ice forces by its mass. Figure 5.3.4 shows a typical Bering Sea type platform which must resist severe ice and wave forces.

Again, due to the present inadequacy of Alaskan construction capacity, these structure types will be built in the South (lower 48, or Far East, or possibly the west coast of Canada).

The structures are large and generally require substantial quantities of material due to the severe operating environment. However, construction requirements tend to be highly repetitive and relatively standard.

5.4 Purchasing After Facility Installation

Once a facility has been installed and commissioned, purchasing responsibility shifts from the consultant or operator project team to the operational divisions in the oil company. Their concern is for equipment and supply purchases during the operation and maintenance phases.

Drilling

Most of the operating companies in Alaska hire drilling contractors to do workover drilling as required for maintenance of wells. A company drilling engineer in the field will specify the equipment required and forward these requirements to the appropriate departments for purchase.

Arco and Sohio are the two operators that have substantial purchasing groups in Anchorage (see Appendix 'A'). The other operators have a purchasing agent who liaises with existing purchasing groups in the lower 48. Each operating company is different in their purchasing pattern but, in general, most are transfering more responsibility to their regional offices in Anchorage. All purchasing requests from the field are routed through these local purchasing agents.

Again, to speed production, it is usual to have simultaneous drilling and production, if the process equipment can be in place. During this period, a constant flow of comsumables is required.

Production operations are not usually contracted out and are generally handled by oil company personnel. The amount of equipment purchased drops significantly during say an average 20 year production life of a system compared to requirements during fabrication and drilling.

Purchasing is usually done through the regional office in Anchorage as itemized below.

Rental or Leasing of Equipment

Equipment which is used for a relatively short period of time such as cementing units, drilling chokes, logging units and some downhole tools are generally leased rather than bought by an operator. Some suppliers will not sell this type of equipment in the United States unless destined for foreign countries or international waters. This equipment must therefore be rented or leased.

The leasing of major drilling equipment would be done as part of the purchasing procedure during fabrication since it is a large piece of equipment and must be interfaced with drilling facilities. Smaller items such as downhole tools used during drilling or workover would be rented by the drilling or production field office as required.

5.5 Purchasing Patterns

5.5.1 General

Owing to the vast number of manufactured items involved in fabrication and operation of a billion dollar production facility, it is not possible, within the scope of this report, to direct equipment manufacturers towards an optimum market approach. However, equipment can be divided into general categories as listed below and as per Appendix 'B', but it is not possible to define a particular market approach that would apply to each category.

Due to the rigors imposed by the harsh arctic environment, the oil company engineer has a larger than normal role in bid list preparation and evaluation. Generally, purchases of standard oilfield equipment will be made through the same channels, with the same procedures used elsewhere. These types of purchases will be handled largely by the purchasing group.

In almost all cases the need for a piece of equipment is determined by the engineer in the field for operation or maintenance requirements, and by the engineer in the office for new construction. A specification is written by the appropriate engineer and submitted to the purchasing department who request bids.

In most cases, the oil company engineers are based in Anchorage and maintain close contact with the appropriate activity area. The purchasing department for Sohio is based entirely in Anchorage. Arco's purchasing system operates mainly from Anchorage with support from Dallas for major items. The other active oil companies in Alaska usually have only a few purchasing personnel in Anchorage who link the engineers with the purchasing divisions established in the lower 48.

The purchase location for the equipment depends on the type of equipment to be purchased viz:

- small, high-wear, high-need items are purchased in the most convenient location (i.e. Prudhoe Bay)
- small to medium sized standard equipment can be purchased in Anchorage or Fairbanks (mainly Anchorage)
- large, sophisticated equipment is ordered specially from the lower 48

The main reason for this hierarchy is cost. It is very expensive to warehouse in Prudhoe Bay (up to Cdn $9/sq. ft./month) versus Anchorage (about Cdn $1.1/sq. ft./month) versus the lower 48. Furthermore, while major oil field supply houses maintain facilities in Anchorage, they tend to stock only the smaller high wear items. Purchases of major equipment items are generally made direct from the manufacturer in the lower 48.

Oilfield supply houses stock the smaller items that are purchased locally. A list of the oilfield supply houses in Alaska is given in Section 6.5. There are relatively few of these. Most supply houses have good communications with the operators and drilling contractors and tend to be very competitive. It should be noted that owing to the small size of Anchorage and the economy base being substantially dependent on the oil industry, business associations tend to be closely interwoven. This may require an above average export drive to penetrate a fairly well integrated system. Most of the present activity and interest is directed towards the North Slope due to the high activity level.

Due to the high cost of warehousing in Alaska the supply houses tend to be small with inventories generally under Cdn $1.0 million.

A summary of potential U.S. purchasers is as follows:

OIL COMPANIES	- field office (at site) - regional drilling office (in Anchorage) - regional production office (in Anchorage) - division purchasing office (in lower 48) - purchasing agent assigned to design consultants office
DRILLING CONTRACTORS	- regional office (in Anchorage) - headquarters (lower 48)
SERVICE COMPANIES	- logging - cementing - directional drilling - mud engineering - wirelining - fabricators (most in Anchorage and Prudhoe Bay)
ENGINEERING CONTRACTORS	- regional office (in Anchorage) - headquarters (lower 48)

The supply houses, agents and oil company offices listed in Sections 3, 6, Appendix G and in this section, will provide initial contacts for equipment marketing. Reference to Section 7 should also be made for guidance on Marketing Strategies.

It should be noted that during conversations with oil companies, drilling contractors and supply houses, it was evident that Canadian products were well accepted in general and in some cases were viewed as premium items. There is a considerable amount of oilfield equiment presently supplied by Canadian companies to Alaska, mainly in the exploration and development drilling phases.

Once production modules are being fabricated in the lower 48, there appears to be a lower tendency to use Canadian products. The reasons for this probably include:

- production modules are usually enclosed and therefore require less specialized arctic technology
- engineering and supply networks are usually established
- Canadian export initiatives may not specifically target lower 48 manufacturers

5.5.2 Purchase Decision Basis

The purchase decision basis varies between the operators, drilling contractors and engineering contractors but generally depends on cost and dependability. Availibility can sometimes be an issue, depending on circumstances. The extent to which a particular item falls into either category varies, with "standard" items being mainly cost driven and the "innovative" items being more dependability driven.

Given the downturn in the price of oil, industry consumers are becoming more cost motivated than previously.

The individual locations of purchase decision centres for operators in Alaska are outlined in Section 3 - Key Entities:

Sohio - Purchases made exclusively in Anchorage (see Appendix 'A') with purchasing requirements on the North Slope determined by:

. Maurice Sullivan and
. Jim Rogers at 907-659-4137.

Sohio's purchase decisions are based on cost once specifications are met.

Arco - Purchases made primarily in Anchorage (Appendix 'A') except for major equipment items related to drilling (i.e. wellhead equipment). Anchorage personnel set up a project management team which consists of engineers, procurement personnel and accountants who direct an Engineering Contractor. Arco also station key procurement personnel at the construction site. Anchorage personnel purchase all production related equipment including large pumps and compressors. The Dallas office procurement division usually handles the major equipment items.

Conoco - Conoco rely heavily on a Project Engineering firm for purchase of standard equipment. Anchorage office is responsible for the design and technical requirements of equipment including evaluation of more innovative products. Houston staff are generally active in the final approval stage.

Major equipment supplies from Houston are usually arranged as follows:

- wellhead equipment, packers, liners
  - Joe O'Brien, 713-293-1509
- tubulars
  - Dave Long, 713-293-2485

Anchorage procurement (incl. North Slope requirements) is handled by:
- Sam Brown 907-564-7600

Chevron - Purchasers for small day-to-day items are by Sharon Shippy 907-786-6629. Larger packages are purchased through San Francisco offices.

Amerada Hess - Rely heavily on design engineering and expertise in Tulsa. The Anchorage office is consulted on equipment specifications and bid lists but final decisions are made in Tulsa. On the very large items, the decision is made in New York.

Exxon - Presently rely on Thousand Oaks and Houston offices (Exxon Co. USA 713-656-3008, Exxon Production Research Co. (EPR) 716-965-4222. Exxon, USA always go to competitive bid unless circumstances are special. EPR do not have a lot of routine purchases and therefore tend to go to bid less than Exxon USA. Exxon base purchase decision on cost and technology.

Thousand Oaks
- Mr. Cunningham 805-494-2000

Anchorage
- Dick Stapleton 907-561-5331

Houston Exxon USA
- Dick Daming 713-656-3547

Exxon is in the process of reorganizing Alaska purchasing procedures with increased emphasis on the Anchorage office
- Manager, Al Herman - 907-561-5361

Union - Union's purchasing department is in Pasadena, California. If a product is needed quickly then their engineer will obtain it in Anchorage if possible. In general, all known long term purchases go through

Pasadena. The drilling department in Anchorage can over-rule the Pasadena office recommendation based on track record or familiarity. Union usually buys from the lowest bidder if the specification is met.

Shell Western E & P Inc.

The need for a product is developed by the Shell engineer either alone or with an engineering contractor. Shell tend to do more work in-house than most major operators. The engineers that develop the needs for offshore Alaska are in Houston.

A specification is then developed by the engineer and passed to the purchasing department in Houston (713-241-6161) which then request quotes (i.e. Shell buys a reasonable amount of their equipment requirements in-house).

The decision to buy is infuenced by both engineering and cost primarily. If it is a new product then engineering is the most important. If it is a standard product then engineering is not as important, with more reliance being placed on cost. Track record may also be considered.

Mr. Lou Wilkerson
Manager Alaska Technology
713-870-2447

5.5.3 Engineering Contractors

Engineering contractors are usually involved on a project-by-project basis and most have a computer-based list of pre-qualified suppliers for their requirements.

In general, the contractor would develop a bidders list from their experience and files which would be approved by the operator. Special technology or equipment would be subject to more detailed investigation and review by both the operator and the engineering contractor.

Outline examples of some the activities of the more prominent engineering contractors follows:

R.M. Parsons -

Engineering development of the Endicott field is well advanced for the operator, Sohio Petroleum Inc. Parson's purchasing managers for the project are:

. Mr. Falkner	818-440-7372
. Mr. C. Bottitta	818-440-7723

Parsons have no computer based system for prequalified suppliers. Every project is done independently on a project-by-project basis by the project purchasing group, which varies in each case.

At the date of this study, Endicott is 95% bid and 80% procured. It is intended that the equipment will be shipped north on the '86 and '87 sealifts for installation in 87-88. Production is scheduled to start in 1988.

Sohio developed the initial bid list, which was augmented by Parsons. Parsons then compared products and made recommendations to Sohio for further detailed development prior to final approval. Once an item satisfies specification requirements, Sohio's final decision on an item is usually based on cost.

An engineering conceptual design study for Seal Island production has recently commenced for Amerada Hess. Parson's project manager is:-

Larry Cox, 818-440-2789

The project is currently in the first stage of conceptual development involving a system of offshore islands with interconnecting pipelines for production to shore. Production is possible by 1990 if reserves are proven by ongoing delineation drilling.

Parsons were also recently awarded a contract by Arco to study transport of Natural Gas from the North Slope to market via a twinning of the existing TAPS, terminating either at Valdez or on the Kenai Peninsula in the Cook Inlet. This project is not felt to be economical on its own because the world gas market is not able to absorb the break-even production rate.

In summary, regarding contact with Parsons, the following main points should be noted:

. the best approach to Parsons for simple straight-forward products is via the purchasing department, at 818-440-2000

. the best approach to Parsons for new, innovative products is through the engineering department

. all work is done out of Pasadena

Fluor -

The principal activities of Fluor in Alaska may be summarized as follows:

- just completing work on Milne Point for Conoco
- working on Lisburne for Arco which is scheduled for sealift in 85 and 86. Five modules will be transported in '85 followed by the major processing facilities in '86
- recently awarded a contract for design and engineering services for the upgrade and expansion of an existing gas compression system on the King Salmon Platform in Cook Inlet

Fluor have reopened an office in Anchorage which is performing most of the design work for the above projects. George Wuerch is the general manager on 907-276-2636

The Anchorage office uses the Irvine purchasing system which works on a project team basis. However, the Fluor system does have a permanent central purchasing group who use a computer based pre-qualified equipment schedule. On large jobs, the purchasers would be relocated to the construction site. For Milne Pt., Fluor set up a procurement team in Washington State.

The following are permanently-positioned key personnel:

. G. Harold Tseklenis	VP Projects 719-975-4695
. Ted E Gazda	Managed Milne Pt. 714-975-5687
. W.C. Breen	VP Alaska (permanent staff) 714-975-2222

In general, Fluor appear to be value motivated when making equipment recommendations to operators (i.e. cost and engineering).

Other major engineering contractors include Bechtel, Brown and Root, Stearns Catalytic, McDermott.

5.5.4 Drilling Contractors

The activity level is increasing for onshore development drilling in the North Slope. Prior to this there was much less work resulting in the drilling contactors becoming extremely cost-conscious. All the drilling contractors spoken to were very much aware of Canadian products and, in some cases were already purchasing Canadian goods when cost effective. In general, the quality of Canadian goods was considered to be high.

The drilling contractors develop equipment requirements based on certain specifications dictated by the operator (i.e. total depth, casing/BOP size, pressure rating etc.) and therefore rigs as a whole tend to be oriented toward specific operator requirements. The independent items that make up the rig are generally contractor selected and based on:

- cost
- availability
- track record
- familiarity

A selection of some of the larger drilling companies plus contacts is as follows:

Nabors Alaska Drilling (subsidiary of Anglo Energy)	. Joe Downey - Drilling Superintendent . Dave Mochizuki - V.P. Engineering . Linda Gourde - Purchasing All purchasing is done through L. Gourde in Anchorage on 907-561-4440. Nabors currently have eight rigs in Alaska and are planning to build more if they are successful in bidding on upcoming projects. All of their rigs are wheel-mounted to facilitate development drilling. Of their eight rigs, five are drilling as of June 1985. Nabors Alaska are an offshoot of Nabors Drilling in Edmonton and are therefore very aware of Canadian oil field manufactures. All Nabors rigs were originally built in Canada with replacement parts being bought wherever price and availability is best. In general, Nabors handles transportation requirements and costing since they usually consolidate shipments prior to transportation North.
Pool Arctic Alaska	. Dennis Smith - General Manager . Randy Hicks - Project Manager Anchorage: 907-276-5464

. Nick Petronio - V.P. Engineering
Houston: 713-954-3500

Pool Arctic are also very familiar with Canadian oil field equipment in general.

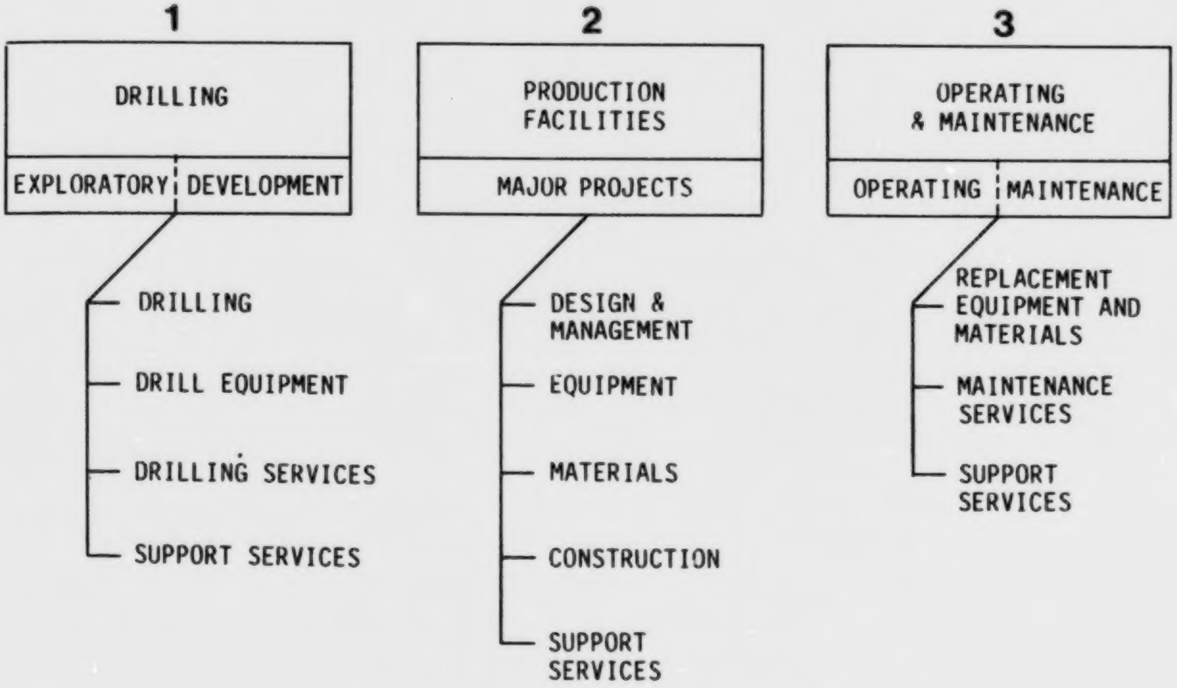
Doyon Drilling

. Nick Semaniuk Manager
. Ben Shafsky Asst. Operations Mgr.
Anchorage 907-278-2631

Doyon Drilling is a joint venture, owned 51% by the Doyon Native group based in Fairbanks and 49% by Nugget Drilling, a Canadian firm founded by the sons of Brinkerhoff. Nugget has 14 rigs in Canada. The operations personnel in Anchorage handle the day to day requirements of the rigs and the Nugget Drilling personnel in Edmonton handle new construction requirements. Their one rig is very mobile and is therefore well suited to onshore development drilling where most of the current activity exists.

Their one rig has worked on a long term contact for Arco since being brought to the North Slope.

Other drilling contractors include Parker, Brinkerhoff, Alaska United, and Rowan.


1
DRILLING
EXPLORATORY
DEVELOPMENT
DRILLING
DRILL EQUIPMENT
DRILLING SERVICES
SUPPORT SERVICES
2
PRODUCTION FACILITIES
MAJOR PROJECTS
DESIGN & MANAGEMENT
EQUIPMENT
MATERIALS
CONSTRUCTION
SUPPORT SERVICES
3
OPERATING & MAINTENANCE
OPERATING
MAINTENANCE
REPLACEMENT EQUIPMENT AND MATERIALS
MAINTENANCE SERVICES
SUPPORT SERVICES

MAJOR OPPORTUNITIES	1	2	3
1. NORTH SLOPE ONSHORE	-	YES	YES
2. COOK INLET	-	-	-
3. BEAUFORT SEA	YES	-	-
4. BERING SEA	YES	-	-

SCHEMATIC REPRESENTATION OF SUPPLIER OPPORTUNTIES

FIGURE 5.1.1

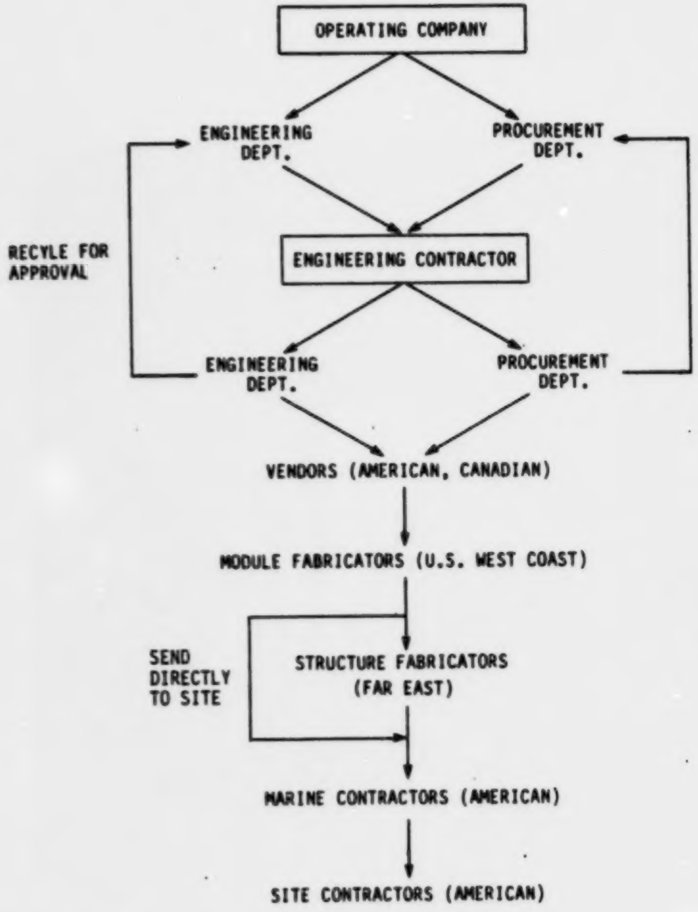

OPERATING COMPANY
ENGINEERING DEPT.
PROCUREMENT DEPT.
RECYLE FOR APPROVAL
ENGINEERING CONTRACTOR
ENGINEERING DEPT.
PROCUREMENT DEPT.
VENDORS (AMERICAN, CANADIAN)
MODULE FABRICATORS (U.S. WEST COAST)
SEND DIRECTLY TO SITE
STRUCTURE FABRICATORS (FAR EAST)
MARINE CONTRACTORS (AMERICAN)
SITE CONTRACTORS (AMERICAN)

FIGURE 5.3.1
PURCHASING APPROVAL SYSTEMS

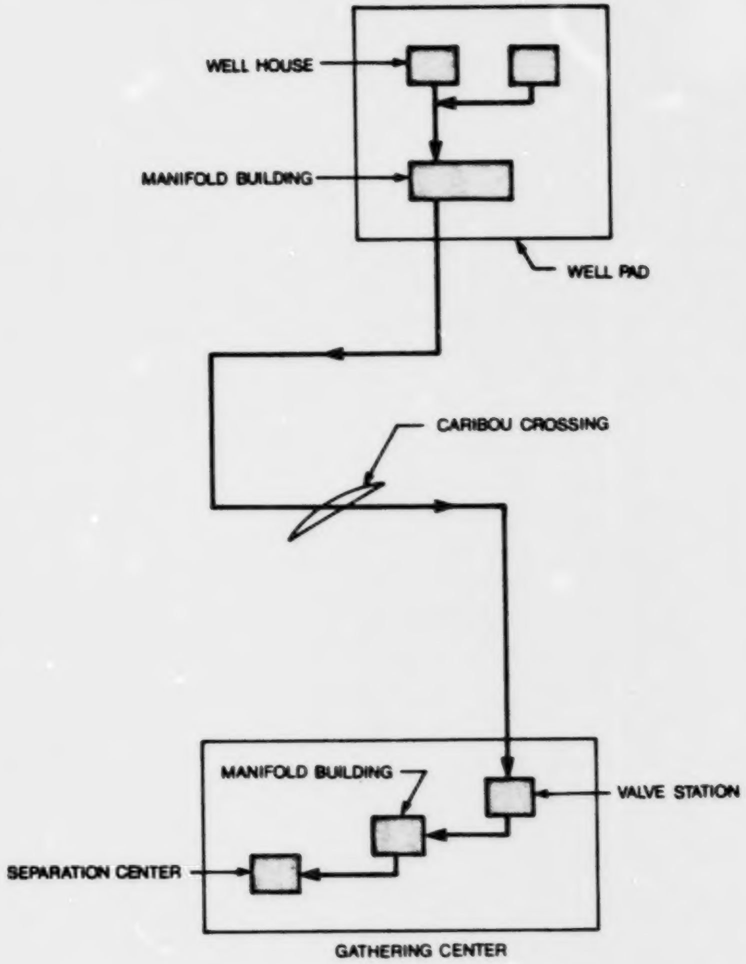

WELL HOUSE
MANIFOLD BUILDING
WELL PAD
CARIBOU CROSSING
MANIFOLD BUILDING
VALVE STATION
SEPARATION CENTER
GATHERING CENTER

FIGURE 5.3.2
TYPICAL NORTH SLOPE (ONSHORE)
OIL PRODUCTION FACILITIES

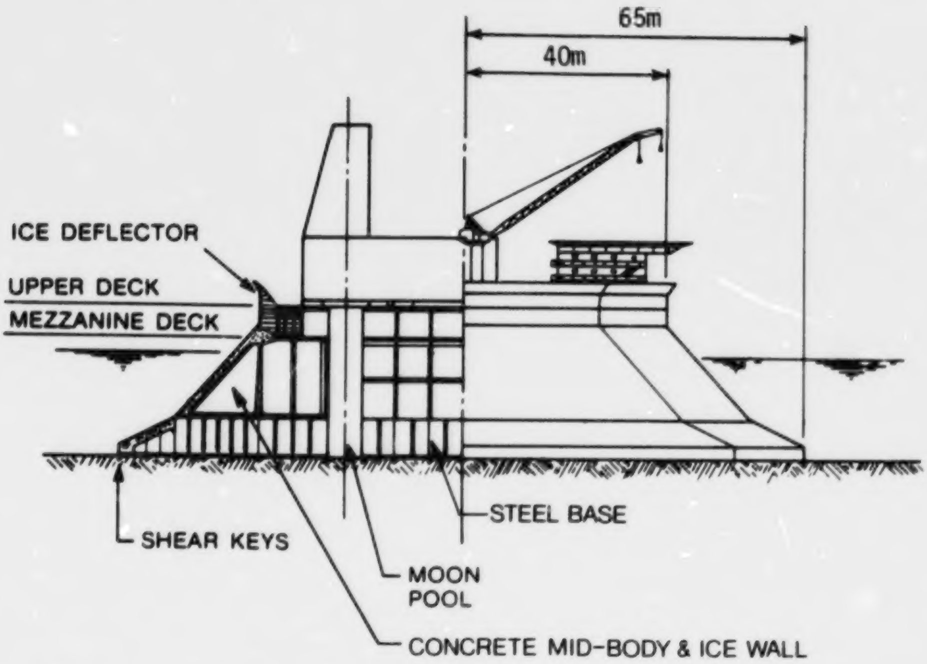

65m
40m
ICE DEFLECTOR
UPPER DECK
MEZZANINE DECK
STEEL BASE
SHEAR KEYS
MOON POOL
CONCRETE MID-BODY & ICE WALL

FIGURE 5.3.3 HYBRID ARCTIC DRILLING STRUCTURE (BEAUFORT SEA TYPE)

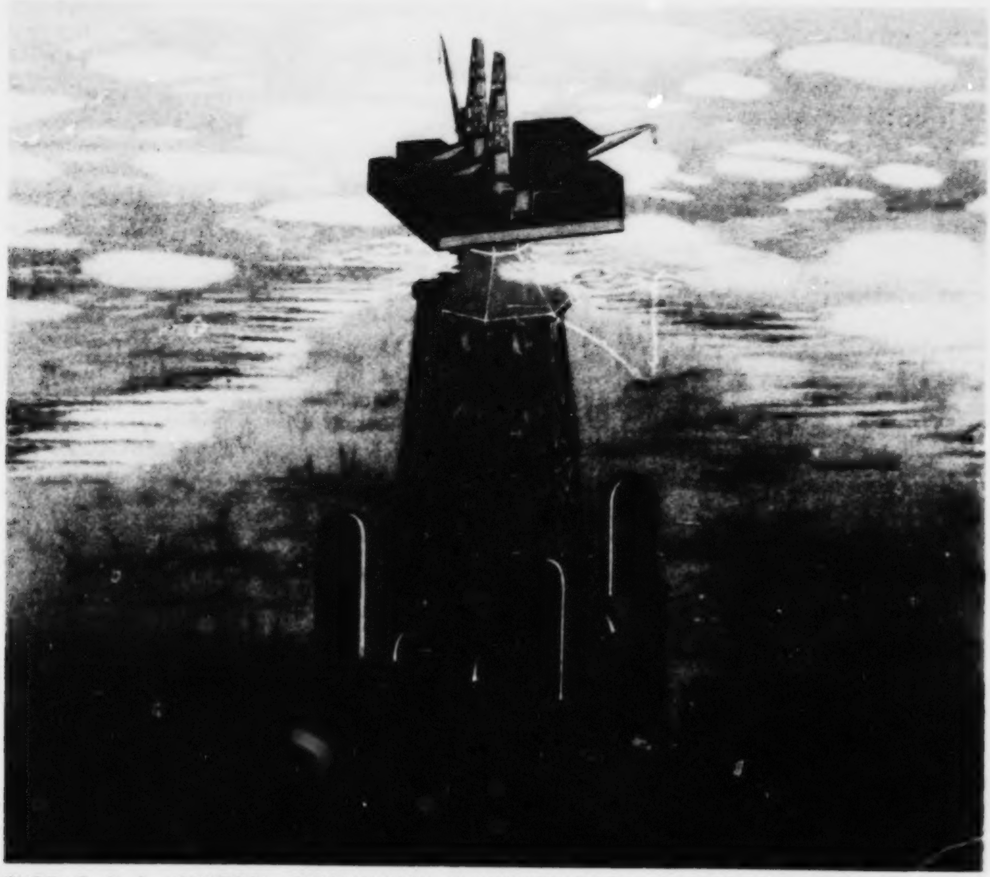


FIGURE 5.3.4 CENTRAL PRODUCTION PLATFORM WITH STORAGE (BERING SEA TYPE)

6. PRICING

SECTION 6

6.0 PRICING

6.1 Preamble

As discussed in Section 5 the operators base most of their equipment purchasing decisions on cost and the strategy for pricing is therefore especially important. Furthermore, the recent decrease in the price of crude oil has strengthened this decision basis.

This section itemizes some of the major cost components that Canadian exporters will be faced with. For most equipment items the transporation costs (discussed in 6.3) will be comparable to those faced by all equipment suppliers to Alaska. The Canadian exporter may be at a disadvantage in terms of transportation costs if modules are being fabricated in the lower 48, depending on specific location. He also must assess the cost of duty on the goods.

However, the relative value of the Canadian Dollar is such that it offers a significant price advantage over U.S. manufacturers.

6.2 Exchange Rates

Although continually fluctuating, the exchange rate has maintained present day levels since February 1982 at about $1.3 Can = $1.0 US.

Present exchange rates should give Canadian manufacturers a competitive advantage over their American counterparts.

Some manufacturers may elect to deal with currency fluctuation exposure by forward buying in order to determine consistent price levels over a certain period.

6.3 Transportation Routes

There are six established transportation routes to Alaska namely:

(a) direct air flight
(b) sealift from Oakland/Seattle areas to Prudhoe Bay
(c) transport to Seattle/Tacoma/Vancouver, B.C. and then by barge to Valdez, or Anchorage, or Whittier
(d) transport by truck or rail within Alaska
(e) transport from Prince Rupert by CN Rail Aquatrain to Valdez, Anchorage or Whittier
(f) transport to Hay River in the Northwest Territories and then by barge down the McKenzie River to Prudhoe Bay

(a) Direct air flight

Route selection depends on the urgency with which the item is required. If the urgency is high, then direct air flight may be advisable. Generally, the need can be high for items that fall into the drilling and, maintenance/operation categories. Since there are no regularly scheduled flights between Canada and Alaska, charter arrangements must be made. Alternatively, routing through existing systems, which would take the equipment through Seattle to Anchorage, can be both cost and time effective. Of course, this is the most expensive mode of equipment transportation to Alaska. In this mode, year round transportation of goods is available. Based on discussions with carriers the costs for transporting air cargo on existing routes from Seattle to Anchorage are:

- A container which carries up to 1557 lbs. and whose dimensions are 98" L x 92"W x 42"H costs US $482.

- Bulk rate (minimum is US$26.00/100 lbs)

  1 - 79 lbs @ US$0.78/lb
  79 - 100 lbs @ US$62/100 lbs
  100 - 220 lbs @ US$61/100 lbs
  220 - 660 lbs @ US$60/100 lbs
  660 - 1100lbs @ US$55/100 lbs

(b) Sealift

The sealift is an annual event leaving the lower 48 around mid-June and arriving at Pt. Barrow before the ice clears in mid August. When the ice clears, the sealift proceeds to Prudhoe Bay. The sealift comprises large barges loaded with equipment and supplies and is generally coordinated through one of the operators (for their particular equipment items) or a freight consolidator. The timing of the sealift is critical. Since the available passage time around Pt. Barrow into the Beaufort Sea may be quite short. The sealift must be in position to act upon any opening of the passage. It is normal for the sealift fleet to assemble early near Pt. Barrow. The sealift began in 1969 and since then only once (in 1975) was it not possible to pass round Pt. Barrow. However the consequences of missing the break in the ice can be very significant. This mode of transportation is therefore generally reserved for large modules (several thousand tons) which cannot be transported by road or rail. Since there is often available space on a given barge, some North Slope supplies can be shipped by this method.

If equipment is to be incorporated in a process module then it must be transported to the module fabrication site. The recent contract let to Brown and Root by Sohio for Endicott and Arco's seawater treatment plant are the only facilities not built on the U.S. West coast. Brown and Root plan to build the Endicott production facilities in New Iberia, Louisiana. Arco's barge mounted seawater treatment plant was built in Korea. Once at the fabrication site further transportation costs are included in the module cost.

It is also interesting to note here that all the major facilities on the North Slope, except for the operations complex for Conoco's Milne Point, were transported via the sealift. Conoco, to speed delivery and eliminate the need for summer transportation, had the operations complex trucked to Prudhoe Bay from its construction site in Boise, Idaho. The production facilities however, will be sealifted to Milne Point from Everett, Washington.

(c) To Seattle/Tacoma/Vancouver, B.C. and then by barge

Transport via Seattle by barge to Valdez or Anchorage is a year round transportation system. The main operators of the barge link are:

. Dillingham Maritime
660 West Ewing St.
Seattle, Wash. 98119
(206) 281-3854
or
201 East Third Avenue
Anchorage, Alaska 99501
(907) 274-1577

. Foss Alaskan Line (affiliated with Dillingham)
Terminal 115, 6700 West Marginal Way S.W.
Seattle, WA 98106
(206) 281-3900

. Totem Ocean Trailer Express, Inc. (Ro/Ro)
Anchorage, Houston, San Francisco, Long Beach, Fairbanks
Vancouver, B.C. Seattle, Chicago, Portland
Vancouver, (604) 682-8278
Manager: James Kohake

. Pacific Western Lines
5225 E Marginal Way South
Seattle, Washington 98134
(206) 762-2960
660 Ocean Dock Road
Anchorage, Alaska 99501
(907) 274-4571

. Marine Logistics Corp.
1441 N. Northlake Way
Seattle, Washington 98103
(206) 632-1441

. Coastal Alaska Marine Lines (CAML)
P.O. Box 1784
Achorage, Alaska 99510
(907) 276-3232
5950 Sixth Aven So, Suite 200
Seattle, Washington 98108
(206) 762-2800

. Coastal Pacific, Ltd.
150 Nickerson St.
Seattle, Washington 98109
(206) 281-0220

. Crowley Maritime Corp.
2401 Fourth Avenue
Seattle, Washington 98121
(206) 583-8100

All of the above, operate regularly scheduled barge shipments to Alaska and most perform consolidating functions for smaller packages. Some independent consolidators are:

. Alaskan Freight and Consolidators, Inc.
7123 S. 185th Street
Kent, Washington 98032
(206) 251-5966

. Span Alaska Consolidators
Seattle, Washington
(206) 624-3670

Sea-Land containers operate a three times per week service to Anchorage via Tacoma, Washington and will also allow full container loads to move to Prudhoe Bay. Rates would have to be checked with Sea-Land in Seattle, Washington at (206) 922-3100. Sea-Land will also move containers from Vancouver to Tacoma.

The barge companies in Vancouver can also arrange for charters from Vancouver to Valdez or Anchorage. Some of these companies are:

Rivtow Straits	(604) 255-1133
Shields Navigation	(604) 873-4312
Pelagic Transport	(604) 278-0436
McKenzie Barge	(604) 929-9434

(d) By truck or rail within Alaska

Once landed in Anchorage or Valdez the cargo is then trucked to Fairbanks, Prudhoe Bay or to points between. Sometimes, goods can be sent by rail as far as Fairbanks. Destinations along Alaska's West Coast are generally accessible only by water or air routes.

Trucking companies that operate within Alaska are:

. Big State Motor Freight
300 Gull Avenue
Anchorage, Alaska 99501
(907) 278-3531

. Frontier Transportation Co.
Anchorage (907) 249-6474
Seattle/Tacoma (206) 572-9437

. Lynden Transport
Anchorage (907) 276-4800
Seattle (206) 575-9575

. Wagoneer Trucking
Anchorage (907) 274-5641

. K and W. Trucking Co. Inc.
Anchorage (907) 338-6420
Seattle (206) 875-2633

These trucking companies listed previously are also available to transport equipment directly from Canada to Alaska. Trucking via the Alaskan highway is generally reserved for smaller equipment packages. Customs can be cleared at the border and with the proper documentation may take only a few hours.

In some cases, an entire drilling rig has been transported by truck up the Alaska Highway requiring some 100 - 150 trucks loads depending on the size of the rig.

There is no direct rail link between Alaska and the rest of the world. The Alaska railroad operates between Whittier (where many barge companies connect) and Fairbanks. For further information contact:

The Alaska Railroad
Pouch 7-2111
Anchorage Alaska 99510
(907) 265-2490
Mr. John Copeland

The railroad has recently started an operation called "the Arctic Fox" which operates overnight between Anchorage and Fairbanks and can handle trailers on flat beds for ease of connection with trucking operations to the rest of Alaska.

The average cost quoted by the barge companies to transport a railcar of general oil field equipment to Prudhoe Bay was Cdn $26.00 per 100 lb for a 45,000 lb load. Obviously the rates vary depending on the size and weight of the equipment being shipped. The transporters should be consulted for detailed pricing of each situation. Generally about ten days are required to make the trip from Seattle to Prudhoe Bay.

(e) From Prince Rupert by CN Rail Aquatrain

The CN Railway offers an "Aquatrain" service which runs every ten days from Prince Rupert and connects with the Alaska Railroad system. The rail cars are placed on a barge so the cargo handling is minimized.

The approximate costs for transportation of general oilfield equipment from Edmonton to Fairbanks are:

30,000 lb load @ Cdn $25.00 per 100 lbs
40,000 lb load @ Cdn $21.00 per 100 lbs
60,000 lb load @ Cdn $15.00 per 100 lbs
80,000 lb load @ Cdn $13.00 per 100 lbs

About 10 - 12 days would be required for the trip from Edmonton to Fairbanks. Further information can be obtained from:

CN Rail Aquatrain
Prince Rupert, B.C.
(604) 624-9151
Mr. Roy James, Car Load Manager

(f) to Hay River and by Barge Down the Mackenzie River

Another method of transport from Canada to Alaska for large packages is via Hay River. The ability to transport large packages minimizes the time and therefore cost of assembly in Alaska. This route may be preferable to routes through Prince Rupert or Seattle due to:

- cost
- the time available to ship to the North Slope is longer compared to the time available when shipping around Pt. Barrow. The ice free water period can be up to one month longer by this route. The units are trucked to Hay River in small packages, assembled into large modules, loaded onto barges, and towed to Prudhoe Bay. This is a summer-only transportation system. The prime carriers for this route are:

  - Arctic Transportation Ltd.
    (403) 436-0742

  - Northern Transportation Ltd.
    (403) 265-4047

With the transport systems available to Alaska, there is generally little opportunity for reducing rates by back-hauling but, under special circumstances, this may be possible.

It is also interesting to note that recently the transportation cost for goods to Anchorage has been decreasing.

6.4 Customs Duties

Drilling or oilfield equipment imported into the United States is subject to U.S. customs law and regulations. The type of equipment being imported will determine the tariff or duty rate that is applicable. These tariff rates are outlined in the Tariff Schedules of the United States (TSUSA), a sample of which is given in Appendix 'M'.

In the TSUSA, commodities are grouped into schedules which cover very broad categories. For example, Schedule 6 is Metals and Metal Products. These schedules are then divided into parts where Part 4, for example, covers Machinery and Mechanical Equipment. Further subdivision results in a five digit number which can be located in the tariff schedule to determine the duty rate.

Due to the wide variety of drilling and production equipment and related items exported, an exact listing of each duty rate that can be expected is precluded here. However, it can be anticipated that a U.S. Customs duty rate of between 3% and 9% will usually be applied based on the 'value' of the goods. The 'value' is generally defined as the transaction price between the Canadian seller and the U.S. purchaser.

Appendix 'M' provides a selected extract from 1984 U.S.Tariff Schedules. Typical examples taken from these Schedules are:

Item	Article	Duty Rate
652.9700	Offshore oil and natural gas drilling and production platforms and parts thereof	6.7%
660.9725	Reciprocating Pumps	3.5%
678.2010	Machinery for sorting, screening, separating, washing etc. (e.g. Shale shakers)	3.4%

Many parts of a drilling rig that would have other non-drilling related uses would be classified differently if imported separately and, in general, higher rates apply to individual equipment components versus packaged or completed modules. For this reason, it is important to determine beforehand the tariff classification and value of any product to be imported into the U.S. This, and other market entry information can be obtained from U.S. Customs, from a U.S. Customhouse Broker or from the U.S.A. Marketing Division (U.T.M.) of the Department of External Affairs in Ottawa. (Phone No.: (613) 993-7484). Specialists in the U.S.A. Marketing Division can obtain official binding classification rulings from the U.S. Customs Service in Washington, D.C. or New York.

Customs Broker's rates in Alaska are very expensive compared to lower 48 rates as indicated below:

- minimum cost is about US $100.00 which will give about an eight hour turn-around
- for special rush jobs, the cost could double

If special requirements dictate that a Customs Broker and officials travel to a remote site (outside of Anchorage) then their expenses must also be included.

With the various transporation methods above, there are several entry locations into the United States:

- Seattle or some other lower 48 city
- Anchorage
- The Alaska Highway
- Prudhoe Bay

In general, it is the importer's responsibiity to arrange for customs clearance, but if warehousing in Alaska is required then the exporter or supplier must consider this aspect.

In general, the easiest location to clear customs from the purchaser's viewpoint is Anchorage. Since they are located in Alaska this allows them to keep in close contact with customs. To speed the customs process most importers use a customs broker such as:

- Perman Stoler
  3440 W. International Airport Road
  Anchorage, Alaska 99502
  Charles T. Edelen

- Marvin H. Parker Inc.
  4510 W. International Airport Road
  Anchorage, Alaska 99502
  Robert F. Broadhead

Both companies appear to know the customs people well (the District Director of Customs is Daniel Holland) and agree that to speed customs clearance proper and complete documentation is required, namely:

- complete and accurate value of goods (invoices)
- complete description of article (use generic terms)
- country of manufacture (duty cost is based on this)
- serial numbers if any

6.5 Oilfield Supply Houses

Discussions with some of the oilfield supply house personnel in Anchorage indicated that a large number of Canadian made products were held in stock. They also added that, in general, they would be willing to stock more Canadian goods provided they were compatible with their product line. All the equipment stocked in Alaska is from out of State, and usually from Texas or Oklahoma. The major supply houses can be found in Anchorage such as:

(a) National Suppy Co. (Div. of Armco Steel Corp.)
5610 Old Seward Hwy.
Anchorage
907-562-2033

National Supply carry everything to keep a drilling rig running but concentrate on small, high wear items mainly for National rigs. They generally have a US $500,000 inventory in Anchorage and keep a list of suppliers of equipment they do not stock. They charge 10 percent for stocking and handling with the transportation costs passed directly to the customer - (907) 562-2033.

(b) Franklin Supply Co.
6621 Arctic Spur Rd.
Anchorage
907-563-3573, Contact Mike Acton

Discussion with Franklin Supply revealed that, at this time, no Canadian product lines were carried in stock. Reasons for this can be summarized as:

- established links with lower 48 suppliers
- no customs problems
- no approach by Canadian manufacturers

Order of magnitude costs for freight, handling, stocking etc. from Seattle were in the region of 20%. The high costs of operating in Alaska also demanded margins in the region of 20%.

There are other small suppliers which concentrate on automotive and light construction parts such as:

. Amco Supply	(907) 272-0544
. Prudhoe Bay Supply-Anchorage	(907) 563-3307
Prudhoe Bay	(907) 659-2550

Prudhoe Bay Supply stock most of their equipment on the slope in their own heated warehouse. They carry mainly small high wear items, welding and cutting consumables, hand tools etc. They cater to the short term needs at Prudhoe and sell very little through Anchorage.

The Kuparuk Industrial Centre is 40 miles west of Prudhoe Bay in the Kuparuk oilfield development, and provides approximately 60,000 sq. ft. of warehouse space with a 240 bed dormitory. The facility also provides, outdoor storage, communications, water and wastewater treatment, office space, power generation etc. The North Slope Borough owns and operates this faciilty and will not allow anyone but an oil company to duplicate the facilities.

Approximate costs are as follows:

- Room rate: US $115.00 per night (compared to US $100.00 in Prudhoe Bay).

- Warehouse and industrial shop space: US $7.00 sq. ft. per month.

- Outdoor pad space leases for US $5,000 per acre per month (27 acres available).

The Kuparuk Industrial Centre is expected to be used by the support sector of the oil industry.

In general, native corporations are not acting as agents or distributors of oilfield equipment. One notable exception is the Kuparuk Industrial Center which is owned by the North Slope Borough and was opened in late 1984. The centre represents the outcome of the first joint agreement between private industry (Arco) and the Borough involving financing, construction and management. The center is managed by Piquniq Management Corp, a partnership of Arctic Slope Regional Corp, Pingo and Ukpeagvik Inupiat Corp. If the Kuparuk Industrial Center is successful, it could lead to future joint venture projects involving the borough and private industry.

6.6 Miscellaneous Costs

(a) Travel and Accommodation

The return air fare cost from Calgary to Anchorage via Seattle is approx. Cdn $1,000 with hotel/motel accommodation varying but in the region of Cdn $100 per night.

Return air fares Anchorage/Prudhoe Bay are in the region of US $480.

(b) Advertising Rates

The study investigated three of the better known industry magazines with the following indicative rates being given:

- Oil & Gas Journal - Advertising Rates per page:
  : Black & White US $2,950 per page
  : Full colour, additional US $1,125
  : Single colour, additional US $275

- Mechanical Engineering - Advertising Rates per page:
  : Black & White US $2,640 per page
  : Full colour, additional US $950
  : Single colour, additional US $330

- Offshore - Advertising Rates per page:
  : Black & White US $2,650 per page
  : Full colour, additional US $975
  : Single colour, additional US $250

- Alaska Oil and Gas News - phone Bonnie Yonker
  (206) 486-6022

- Alaska Journal of Commence - phone Bonnie Yonker
  (206) 486-6022

Trade Shows

Detailed reference to trade shows that are relevant to the Alaska oil and gas industry is made in Section 7 of this study.

6.8 Pricing Structure

Competitiveness in pricing becomes the major issue if quality can be demonstrated by a proven track record backed by compliance with acceptable U.S. standards.

This is the case whether a purchase is being considered in Alaska or the lower 48, and individual strategies will have to be developed for the product or service in the distinctly separate market areas (Refer to 7.1.2 in Market Strategies).

The following broad guidelines have been developed as a list of general recommendations when considering a particular price structure. Every situation will have to be assessed on an individual basis if realistic pricing levels are to be determined.

As further guidance in developing a pricing structure, reference should be made to Appendix 'B' which gives indicative prices for typical equipment in use in the Alaska area. The price levels shown should not be relied upon as absolute and are provided for reference only.

(a) Whenever possible, prices should be quoted inclusive of all duties, fees, commissions, delivery, etc. This is particularly so for lower 48 marketing and may be more difficult to fully determine for Alaska depending on the final destination.

(b) If freight is difficult to assess until a fabrication is completed, provide a freight estimate and arrange for separate invoicing. This is true for both lower 48 and Alaska shipping.

(c) Currency exchange risk between U.S. and Canadian dollars may need to be addressed. As a matter of policy, prices should be quoted in U.S. dollars.

(d) Fully investigate transportation options as substantial economies can be obtained. This is particularly relevant for the lower 48 but less so with the limited options available for northbound freight.

(e) Obtain official binding classification rulings from the U.S. Customs service in advance, and be sure all documentation is complete and available. This was considered an undesirable obstacle by one supply house.

(f) Consider brokers and brokerage fees carefully as these can vary widely. This is particularly so for the lower 48 but less so for Alaska since there are fewer of them.

(g) Select suitable supply houses if relevant to the market area and product and determine handling margins for both stocked and non stocked items.

(h) Consider establishment, promotional and regular marketing expenses over a suitable period noting the anticipated growth for the region. This again will vary with individual market targets and strategies.

(i) Consider establishment, promotional and regular marketing expenses in association with a complementary joint venture arrangement running a local marketing office. Depending on the export product or service, assess the potential of native joint venture arrangements.

(j) Consider savings in transportation costs by operating a complementary joint venture private carrier service. This would be applicable to marketing in the lower 48 only.

(k) Consider additional costs of communciations and travel associated with marketing in Alaska, and the lower 48 for large module fabrications.

7. MARKETING STRATEGIES

7.0 MARKETING STRATEGIES

7.1 Overall Strategy

7.1.1 General

In developing exports to the onshore/offshore Alaskan oil industry, it is recommended that a carefully considered business plan be assembled which should include:

- selection or identification of a suitable opportunity (or opportunities)
- decide on a means of representation and an approach to the market

The plan should be sufficiently flexible to adapt to the changing needs of any market place and provide for:

- continued development and contact,
- back-up facilities, and spares,
- consumer confidence,
- long term presence
- market awareness

This study is intended to assist all sectors of Canadian industry in developing a total marketing strategy for the Alaska oil and gas market. The sections that follow are intended to identify some of the finer points which may be relevant to individual exporters.

A special section has also been developed for business opportunities that may involve native participation.

7.1.2 Strategy Overview

As discussed previously in this report, there are three main aspects to the oil and gas market in Alaska:

- exploration drilling,
- production,
- operating and maintenance.

Since only the North Slope, and to a lesser degree Cook Inlet, are producing, only these areas offer opportunity to supply equipment and services to existing operating facilities. This is particularly so for the North Slope region.

Also, new production related projects apply mainly to the North Slope including Sohio-Endicott, Arco-Lisburne and Conoco-Milne Point. Marathon's plans for a gas platform in Cook Inlet is the main exception. However the potential of the Beaufort Sea & Bering Sea suggests that, in a number of years, production projects involving both structures and topsides will proceed in these areas. Subsequently, operating and maintenance requirements will develop in these areas.

The high cost of drilling exploration wells onshore/offshore Alaska tends to limit the activity level. In recent years the activity level has been increasing but, considering the size of the areas yet to be explored, it must be considered conservative. However, the following matrix identifies the area potential for the three main aspects of the oil and gas market outlined above.

Market Areas	Cook Inlet	North Slope	Beaufort Sea	Bering Sea
drilling	yes(1)	yes(3)	yes	yes
facilities	yes(2)	yes	-	-
operation and maintenance	yes	yes(4)	-	-

Notes:

(1) - drilling from existing platform rigs
(2) - relatively minor opportunities
(3) - mainly infill drilling by established North Slope drilling companies
(4) - an increase in requirements is imminent

The recent oil price decreases have not had a major impact on the efforts and plans of the operators since production from new finds will not be on-stream for about ten years from discovery (see Fig. 2.1.3). However, if oil prices continue to decline some plans may be temporarily shelved.

Some of the more subtle aspects of marketing strategy which became apparent during the course of the study may be summarized in the following recommendations:

. Understand the harsh environment and remote location.
. Understand the particular environment and economics of the industry as a whole.
. Understand the dominant economics of the product or service sector being approached.
. Present lean times force operators to be more cautions and concentrate limited resources on the more critical items.
. Reduce uncertainity.
. Focus on practicalities of arctic operations.
. Position strategy to respond to market needs.
. Present decline in crude oil prices dictates a cautious pace of exploration/development which tends to be guided by market demand and innovation.
. Increase innovative effort.

- Onshore heavy oil reserves may affect offshore efforts.

It should be remembered that a marketing strategy may need to address facility fabrication or facility installation specifically since these ar normally separated geographically into the lower 48 and Alaska areas respectively.

7.2 Local Participation

7.2.1 Background

The native corporations play an especially large role in the present and future development of Alaska Oil and Gas projects and exist primarily to protect the interests of the native Alaskan people. The active corporations and the State own all the onshore land within the 3 mile offshore limit. The MMS owns all the offshore lands on the OCS. The native corporations are organized into 12 regional corporations as follows; names, addresses and phone numbers being given in Section 3 - Key Entities. The 12 main corporations represent a total of 172 village corporations which were originally formed in 1971.

- Sealaska Corporation (Juneau)
- Cook Inlet Region Inc.
- Arctic Slope Regional Corp.
- Bering Development Corporation
- Chugach Alaska Corp.
- AHTNA, Development Corp.
- Nana Development Corp. Inc.
- Doyon Co. J.V.
- Bristol Bay Native Corp.
- Kuskokwim Corporation
- Calista Corporation

The native groups own areas roughly proportionate to their population size which was intended to be approximately equal. However, the resource value/potential varies significantly between the groups. The native groups derive income by leasing their lands for oil and gas exploration and development.

The native groups of Nana, Cook Inlet, Arctic Slope, Bristol Bay have high involvement in oil and gas development. Nana runs a services warehouse/gas station/camp in Prudhoe Bay. Cook Inlet and Sealaska Corporations are among the more active.

Calista is based around Bethel and is quite anti-development as is Bristol Bay mainly due to environmental (fishing) concerns. Cook Inlet (CIRI) is pro-development. George Christie is the executive Vice President of CIRI in Anchorage, 907-274-8638.

Doyon Native Corp. owns a majority of the interior land in Alaska surrounding Fairbanks and have formed a drilling joint venture with Nugget drilling of Canada. This has been very successful. The area controlled by Doyon Native Corp. has only been subject to two exploration wells. Arco is considering sinking more exploration wells on this land in the future. Morris Thompson is the VP of corporate development for Doyon in Fairbanks, 907-452-4755.

The State of Alaska receives a 1/8 share (royalty) of all oil and gas produced in Alaska. The royalty can be taken "in kind" - the State then sells it or "in value" - where the operator sells it for the State. The State is represented by the Alaska Department of Natural Resources - Division of Oil and Gas - Esther C. Wunnicke, Commissioner, 907-276-2653.

Since the State also owns land it also collects lease monies from the operators. The State then takes these monies and makes payments to all residents of Alaska. It also provides standard public services.

There are 11 Boroughs which are municipal governments:

- Fairbanks North Star
- Kenai Peninsula
- North Slope
- Bristol Bay
- Juneau
- Matanuska-susitua
- Kodiak Island
- Sitka
- Anchorage
- Haynes
- Ketchikan

The Boroughs receive a share of the State revenue. They also levy a tax on industry in general, and provide services such as transporatation, health care, education and garbage collection. These services are also charged for.

The Federal Government receives monies from their offshore leases but not for their onshore leases since they are tied up in the National Petroleum Reserve (NPR) and the Alaska National Wildlife Refuge (ANWR).

The native groups are very powerful and recently, operators have formed joint ventures (JV's) with the appropriate, local groups:

This ensures:-

- support for the native group
- local hiring of residents,
- good public relations

It would be useful to discuss representation or joint venture arrangements with these corporations in some instances. Dayon Drilling is one example of such a successful joint venture.

The following sections expands further on the concept of native participation in business development models.

7.2.2 Native Business Development

The principal models of business development in association with native groups include:

- Equity Participation
- Joint Ventures
- Management Agreements
- Service Contracts
- Mergers

Each of these will be expanded in general terms below as an initial guide to potential strategy development.

Equity Participation -

Depending on the exporting enterprise requirements, this may involve:

- participation in an existing limited company or enterprise
- ownership rights in sub-surface resources
- a combination of both, where equity in the resources is used to purchase equity in the production, refining or marketing ventures

These arrangements are most commonly found in resource extraction and/or processing projects.

Joint Venture -

This is a legal arrangement whereby an existing company or enterprise combines forces with another similar organization. A joint venture may not require risk capital participation on the part of one partner. The non-capital contributing partner may bring managerial skills, a patent or new idea, manpower, or a specific asset to the venture. Joint ventures are usually temporary and contract-specific orientated.

Properly structured joint ventures include:

- profit sharing agreements
- buy-out agreements
- management agreement

Management Agreement -

This is a means of selling management talent for a contracted time period to guide an existing or contemplated company. Management contracts may take the following possible forms:

- advise existing management who remain in control
- take over the management function of the company

Should a local company decide to enter into a management contract it would most likely consider management training for local people. The management contract can and should specify who is to be trained on-the-job and how their training should be evaluated.

Service Contracts -

This is similiar to a management agreement, being a means of performing a service for a fee or consideration. This could involve a native corporation retaining control of product rights but contracting out a processing stage for a fee or payment in kind.

Merger -

This is the absorption of one company by another existing company. This can provide a number of benefits to the company being taken over, including access to new technologies, management expertise, risk capital etc. For the absorbing company, the merger partner must constitute an asset worth acquiring, possibly involving serveral years of successful operation or by having a capital asset worth the risk of acquisition.

In general, native corporations are not acting as agents or distributors of oilfield equipment. However, the North Slope Borough has recently completed the Kuparuk Industrial Centre in association with Arco (see Section 6.5).

7.3 Approach

It has been seen that most purchase decisions are made in either Anchorage or on the U.S. West Coast. Purchases made in Anchorage are mainly by drilling contractors and operators for drilling and operational requirements only. Purchases organized on the West Coast are usually done by the engineering contractors employed by the operators. As noted previously, the engineering contractors are, in general, closely controlled by the operators.

The purchasing department usually controls the standard items and rely heavily on their engineering department for new and innovative items.

A point by point form of approach is given in Section 1.7 of the Executive Summary which provides a general outline for developing an initial approach to marketing in Alaska. Potential exporters should bear in mind that sales are not usually confirmed after a single approach, and that repeated representations are necessary to consolidate a new position in the market.

More particularly, the recommended approach for developing equipment sales to the Alaskan oil and gas industry should include the following primary considerations:

- identify the project and the need
- identify the operator
- identify the operator's procurement agent for that item
- identify the operator's engineer for that item
- identify the engineering contractor (if any)
- identify the contractors procurement agent for that item
- identify the contractors engineer for that item
- CONTACT ALL PARTIES

However, these parties are usually in different geographic areas and contacting all of them can be both time consuming and costly.

As noted in Section 4, there are two main classes of equipment:

- new and innovative,
- standard

The new and innovative equipment is handled mainly by the operator's engineering department, so marketing efforts should be concentrated in this area. However, the purchasing department can have some discretionary control over the engineering department and should not therefore be overlooked.

There is potential for combining forces with established companies to assist with initial marketing efforts ranging from:

- supply house representation, to
- joint ventures with existing companies or native groups, to
- existing Canadian exporters, and to
- existing importers of Canadian equipment

The use of supply houses and or local representation by an agent is most appropriate for standard oilfield equipment. Innovative items which require special knowledge of capabilities are less appropriate for agent representation. Refer to Section 3 - Key Entities, Section 6.5 and Appendix 'G' for contact information.

As identified previously, the supply houses in Alaska stock only relatively small, high wear equipment items. Depending on the product, the absence of a supply house arrangement may not be a disadvantage from an availability viewpoint. This would be especially true for innovative equipment.

Joint Ventures with existing companies or native groups offer an especially powerful marketing tool since there is always an incentive to maximize local content. However, this avenue is not appropriate for many equipment items. Doyon Drilling is an example of a rather successful joint venture for a drilling contractor. In general, Alaskans view Canadians, especially Northern Canadians, and Canadian products well. Section 7.2 addresses local participation in general terms leaving the specifics of an individual arrangement to be subject of detailed negotiation with the parties involved.

As discussed previously, there are several drilling contractors established in Alaska that have ties to Canada (Nabors Alaska, Doyon and Brinkerhoff). Furthermore, they have built rigs in Canada. These contractors represent a potential good market if new rig construction is required. If it is possible to supply to these organizations for new construction, then adequate follow-up could generate spare parts, and replacement sales. Furthermore, they may provide an initial market entry and eventually a track record for widening sales in other areas.

The same philosophy applies to existing importers of Canadian equipment. Since they already know Canadian products of one type they are more likely to accept another.

7.4 Promotional Methods

The main objective of any approach to a new market is to publicize the company name and the product(s). Trade shows, paper presentations and magazine advertising are generally considered the most favourable of promotional techniques.

The Offshore Technology Conference (OTC) held annually in Houston, Texas covers a wide spectrum of the offshore industry and should be seriously considered as part of any major promotion. This is the best attended of the shows and attracts most key people in the industry. Participation in OTC can range from simply attending to exhibiting with obvious cost differences. Federal and Provincial governments usually have booths at the OTC for those interested in exhibiting and often supply space for interested exporters.

The OTC Long Range Schedule is:

- May 5-8, 1986
- May 4-7, 1987
- May 2-5, 1988
- May 1-4, 1989
- April 30 - May 3, 1990

The administration headquarters are located at:

- OTC Headquarters,
  P.O. Box 833868,
  Richardson, Texas 75083-3868
  USA

The Arctic Offshore Technology Conference (AOTC) is also held annually at varying locations and specifically covers the arctic regions. Conference are usually scheduled for August/September and arrangements can be made through:

. Dorinda Wong
Suite 101,
3009 23rd Avenue S.W.
Calgary, Alberta
T3E 0J3 (403) 242-4288

Also the American Society of Civil Engineers (ASCE) holds a conference, usually every Spring, which is oriented toward civil engineering in the "Arctic-Offshore". It is usually called Arctic '86 (year as appropriate) and is organized by:

. ASCE
345 East 47th St
New York, N.Y. 10017-2398
(212) 705-7496

Periodically, various professional associations such as the International Association of Drilling Contractors (IADC) will have local shows focusing on Alaska. Information on these can be obtained through professional organizations or trade publications such as Oil and Gas Journal which generally publish a calendar of upcoming events.

It is always useful to place and maintain company name and product before the industry and in this manner, trade magazines are a useful tool. In addition to simple advertisements, the publishing of technical papers in these journals can be advantageous. This indicates a thinking, innovative approach to the industry sector of particular interest. However, this sort of promotion is largely directed to technical people in engineering departments. Purchasers must be made aware of product developments so follow-ups to contact the purchasing groups, as well as the technical personnel, are very important.

Presentation of technical papers at trade conferences are normally welcomed and these often serve as an excellent means of acquainting key people with new technology, a service or a particular product.

Advertizing in general, obviously serves to improve awareness and promote the product or service in the market. Available vehicles for advertising include the following with indicative rates being given under Section 7.7.

. Alaska Telephone Utility
600 East 38th Avenue
3rd Floor
Anchorage, Alaska
(907) 563-4403

. Oil and Gas Journal
313 Freeway Center Bldg.,
3605 Long Beach Dlvd.
Long Beach 90807
(213) 426-7008
Subscription US $34 per year

. Mechanical Engineer	345 E. 47th St. New York, N.Y. 10017 (212) 705-7784 Subscription US$12 per year
. Offshore	1200 Post Oak Blvd, Suite 106, Houston, Texas 77056 (713) 621-9720 Subscription US $45 per year
. World Oil	Gulf Publishing Co. 3301 Allan Parkway Houston, Texas 77019 Subscription free
. Alaska Construction and Oil	P.O. Box 101980 Anchorage, Alaska 99510 Subscription US $36 per year
. Alaska Journal of Commerce and Pacific Rim Reporter	2106 Cleveland Avenue Anchorage, Alaska 99503 Subscription US $49 per year
. Alaskan Oil and Gas News	2106 Cleveland Avenue Anchorage, Alaska 99503

7.5 Assistance

The Program for Export Market Development (PEMD) helps Canadian corporations to develop, increase and sustain their activities by sharing in the costs of specific marketing efforts.

PEMD is geared to:

- encourage businesses to begin export marketing
- encourage established exporters to expand into new markets

PEMD provides up to 50 per cent of the costs incurred by a company in its penetration of new markets. These contributions are repayable if sales are made to that market.

The Program for Export Market Development has various sections, each designed to meet a specific circumstance which may result while developing or expanding new or existing export markets.

Additional information may be obtained by contacting the Regional Offices of DRIE (see Appendix L).

Periodic contact with the Canadian Consulate in Seattle, Washington may be able to offer up-to-date information on certain issues.

Address: Mr. Allan Poole
Consul & Senior Trade Commissioner
Canadian Consulate General
412-Plaza 600
6th & Stewart
Seattle, Washington 98101-1286
(206) 443-1777

7.6 Representation

To increase sales of Canadian goods and services at a rate sufficient to improve market share, due care and consideration should be given to proper representation on an ongoing basis.

The following points of representation are noted for guidance and likely to contribute to a successful marketing strategy:

- Ensure good back-up service and spare parts availability. Be prepared to extend normal limits of co-operation if competition is to be beaten.
- Follow up on product serviceability with end user with intent of improving technology, anticipating problems and enhancing credibility.
- Frequent contacts with businessmen in the industry. Be careful of over-representation.
- Develop engineering contractor and consultant contacts for ongoing technology and product awareness. This would keep technology and product development up front and allow some insight to developments by competitors.
- Ensure consumers are aware of a continuous and 'real' presence in the market that can be relied upon at any time both now and in the future.

Given the foregoing, it would appear that the most viable marketing concept would be for manufacturers to consider establishing a suitable marketing office in Alaska from which regular marketing activities and continued representation can be organized. For certain enterprises, local participation arrangements may be attractive (Section 7.2).

Such a marketing office would carry out the functions of a regional distributor and technical advice centre whilst also providing an operating link with factories in Canada. It could be either individually or collectively established and would ensure an environment which would strengthen any export initiative.

Individual action along these lines may be neither practicable nor economic which suggests formation of a complementary joint venture arrangement. The presence of an Alaska based marketing organization will undoutedly enhance credibility and provide necessary assurance to the industry as a whole.

Assuming either an individual or joint venture marketing office to be viable, some of the advantages that can be realized are:

- Immediately available technical assistance.
- Monitor activities of selling orgaizations at first hand.
- Maintain better overall market awareness.
- Have the capacity to respond quickly to perceived changes in the market.
- Identify defaulting distributors quickly and move to minimize loss of credibility and sales.
- Respond quickly to faulty equipment.
- Potential reduction in transportation costs.
- Change customs brokers/agents/salesmen if necessary.
- Much enhanced credibility in the market place.
- Inititate selective/intensive marketing programs when needs arise.

In conclusion, it is considered that far more sales can be made over a given period if a marketing office can be established. Regarding the smaller manufacturer, it should be possible to formulate a joint venture given complementary product or service lines as discussed earlier.

As before, Section 1.7 gives a point by point form of approach which should give some guidance on developing an export initiative.

8. APPENDICES

APPENDIX 'A'

ARCO ALASKA & SOHIO PURCHASING CHANNELS

PURCHASING CHANNELS - ARCO ALASKA INC./ARCO OIL & GAS COMPANY/ARCO EXPLORATION COMPANY

In the first instance, exporters are advised to contact the Alaska purchasing arm, who may or may not refer enquiries to the Dallas office. Refer also to Section 3.2 of the report.

OPERATIONS: L.E. Hodges Jr. - Director

GROUP #1 (Dallas)	Buyer #	GROUP #2 (Dallas)	Buyer #	GROUP #3 (Dallas)	Buyer #
J.A. LeVelle, Dir. (214) 880-4905		L.W. Carlisle, Dir. (214) 880-4926		T.C. Dunn, Dir. Regina Davis (214) 880-4930	
Ruth Harrington (214) 880-4908		Phyllis Wuthnow (214) 880-4138		R.L. Colliser, Jr. (214) 880-5242	77
R.D. Collins (214) 880-5208	72	M.A. Barthelemy (214) 880-4924	61	G.M. Henderson (214) 880-5894	75
C.J. Fuller (214) 880-4906	62	C.C. Belew (214) 880-4382	64	R.J. Schulte (214) 880-4915	66
W.G. Hill, Jr. (214) 880-4902	71	M.M. Campsey (214) 880-4903	74	K.L. Swofford (214) 880-5163	78
R.E. Horton (214) 880-4910	69	D.I. Cole (214) 880-4916	67	E.P. Thomas (214) 880-4931	60
W.B. Johnson (214) 880-4920	63	T.O. Davis (214) 880-4911	68		
A.J. Tamporello (214) 880-4919	76	W.M. Guckian (214) 880-4907	73		
		N.E. ZumMallen (214) 880-4912	70		

ALASKA : P.J. Hilderbrandt - Director
(local purchases)

Nancy Parr (Secretary) (907) 263-4421		G.E. Kunde (907) 263-4423	65
A.R. Tobin, Jr. (907) 263-4422	80	S.L. Tubbs (907) 263-4431	79

Groups #'s 1, 2 and 3 are subdivided by equipment category on the following pages.

ARCO ALASKA INC. - PURCHASING GROUP INDEX

GROUP #1 - EQUIPMENT CATEGORIES

Sinker bars	72-63
Bits, drilling, rotary	63-72
Bolts, general	76-69
Cable, wire rope	76-72
Chokes, adjustable	63-72
Chokes, automatic	63-72
Chokes, bottom hole	72-63
, flow	63-72
, positive	63-72
, side door	72-63
, storm	72-63
Core bits, drills	63-72
Drill bits	61-72
Drill, seismic	72-63
Fabrications, steel	76-72
Generators, 50kw	73-68
, 50kw up	68-73
Electric parts	73-68
Joints, ball	76-69
Metal, hard surfacing	76-72
Protectors, thread	69-72
Rods, polished	72-63
, pony or sub	72-63
, pull	72-63
, steel	76-72
, sucker	72-63
Rope, wire	76-72
Screen, gravel packed	72-63
, slotted	72-63
Slings, pipe	76-72
, wire rope	76-72
Thread protectors	69-72
Winch lines	76-72
Wire rope	76-72

ARCO ALASKA INC. - PURCHASING GROUP INDEX

GROUP #2 - EQUIPMENT CATEGORIES

Air Compressors	68-74
Filter Elements	74-68
Assemblies, bearing	61-70
Assemblies, cylinder-head	68-74
Automative, winches	61-70
bodies, trailer	61-70
cranes, shovels	61-70
engines	61-70
tires, batteries, accessories	61-70
Backhoes	61-70
Ball bearings	61-70
Batteries, automotive	61-70
Batteries, power supply	73-70
Batteries, stand-by	73-70
Bearings	61-70
Belts	
automative seat	61-70
chain	61-70
rubber covered	61-70
transmission	61-70
V-type	61-70
Engine, automotive	61-70
Engine, other	68-74
Pillow	61-70
Bodies, trailers	61-70
Bodies, truck	61-70
Brake lining	61-70
Bulldozers	61-70
Bushings, bearings	61-70
Cable, battery	61-70
Chain, drive	61-70
Chain, tire	61-70
Charger, battery, power supply	73-70
Cherrypickers	61-70
Clutches	61-70
Compressors, air	68-74
, gas	68-74
, parts	68-74
Converters, torque	61-70
Couplings, self-align	61-70
, shaft	61-70
Cranes	61-70
Crawlers, tractor	61-70
Cylinders, compressor	68-74
Dragline	61-70
Drives, belt, chain	61-70
, chain, gear	61-70
, hydraulic	61-70
, variable speed	61-70
Filters, engine	74-68
Gaskets, automotive	61-70
Gears, pinions	61-70
Glass, automobile	61-70
Governors, engine	68-74
Graders, road	61-70
Heads, cylinder	68-74
Heat exchangers	70-61
Heaters, automotive	61-70
Heaters, direct	74-68
, indirect	74-68
, oil	74-68
Joints, universal	61-70
Lift trucks	61-70
Lifts, automobile	61-70
Lifts, truck	61-70
Loaders, front end	61-70
Lubricators, forced	70-61
Magnetos	68-74
Motors, hydraulic	70-61
Packaged compressors	68-74
Piston rings	68-74
Power shovels	61-70
Power take-offs	61-70
Pumps units, air beam, crank	61-70
Radiators, automotive	61-70
Regulators, hydraulic	64-73
, voltage	73-64
Repairs, engine	68-74
Rings, piston	68-74
Rods, piston	68-74
, pump	70-61
Separators, gas, oil water	74-68
Shafts, compressor	68-74
Shock absorbers	61-70
Shovels, power	61-70
Spark plugs	61-70
Switches, disconnect	73-64
engine, safety	68-74
Tachometers, engine	68-74
Take-off, power	61-70
Tanks, propane	61-74
Torque converters	61-70
Tractors, crawler	61-70
winch type	61-70
Trailers	61-70
Transmissions	61-70
Trucks, automotive	61-70
Winches, automotive	61-70

ARCO ALASKA INC. - PURCHASING GROUP INDEX

GROUP #3 - EQUIPMENT CATEGORIES

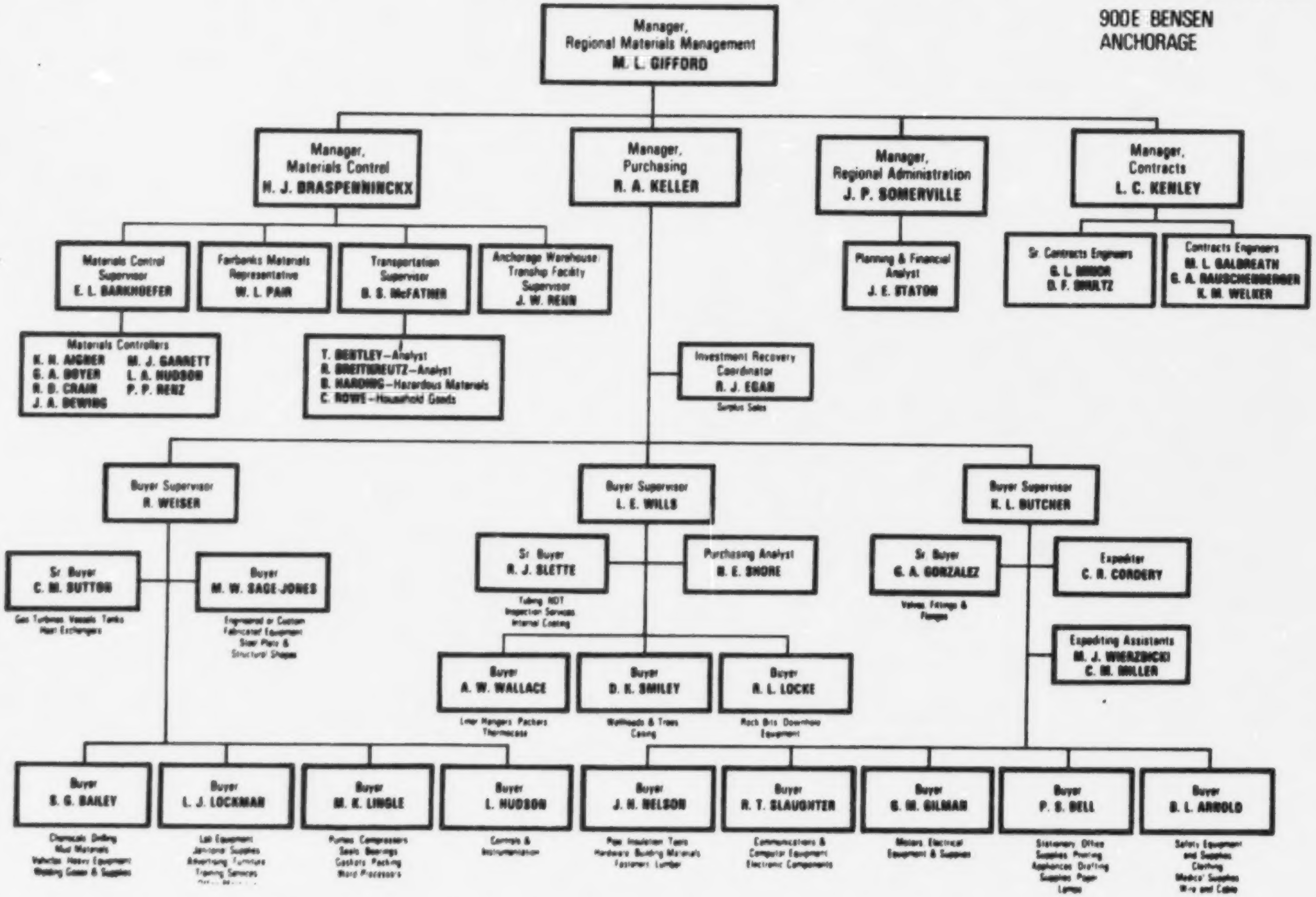
Acetylene	75-77
Air Hose	77-75
Air Tools	77-75
Anchor Chain	77-75
Anti-Freeze	77-60
Automotive, jacks	77-75
, tools	77-75
Belts, safety	60-75
Bits, geophysical	75-77
Snatch	77-75
Bottles, caps	60-77
Buckets	60-75
Cable, welding	75-77
Chain	77-75
Chain, anchor	77-75
Clamps, anchor	77-75
, wireline	77-75
Cloth, wire	77-75
Couplings, air hose	77-75
, hydraulic	77-75
Cuttings, welding	75-77
Cylinders, gas	75-77
Exhaust Hose	77-75
Fittings, wire rope	77-75
Gauges, temperature	75-77
Gloves, welding	60-75
, work	60-75
Greases	60-77
Grinding wheels	77-75
Hacksaws, hand	77-75
, power	77-75
Hammers, hand	77-75
, pneumatic	77-75
Hardware, general	77-75
Heaters, air	75-60
Heaters, portable	75-60
, space	75-60
Holders, tool	77-60
Hooks, crane	77-75
Hose, accessories	77-75
Lights, flood	75-77
Lubricants, bearing	60-77
casing, all	60-77
purpose, tread	60-77
tubing, tool	
joint, valve	60-77
Lubricating Equip.	77-60
Material Handling Equipment	77-75
Methyl Alcohol Methanol	77-60
Nitrogen, bottled	75-77
Oils	60-77
Oxygen, bottles	75-77
Pneumatic tools	77-75
Propane	60-77
Regulators, bottle gas	75-77
Rods, stadia	75-60
, welding	75-77
Rope, manila, sisal, jute	77-75
Safety supplies	60-75
Screening wire	77-75
Tools, hand	77-75
, impact	77-75
, industrial hand, portable electric	77-75
Welding, cable	75-60
, electrodes	75-60
, gloves	60-75
, helmets	75-60
, units electric, gas	75-77
Wipers, cloth	60-75
Wire cloth	77-75
Wrenches, adjustable	77-75
, box chain, impact, electric, pipe, ratchet, socket, sucker rod, tubing	77-75

SOHIO ALASKA PETROLEUM COMPANY

MATERIALS MANAGEMENT

TELEPHONE: (907) 561-5111

900E BENSEN
ANCHORAGE


Manager, Regional Materials Management M. L. GIFFORD
Manager, Materials Control H. J. BRASPENNINCKX
Manager, Purchasing R. A. KELLER
Manager, Regional Administration J. P. SOMERVILLE
Manager, Contracts L. C. KENLEY
Materials Control Supervisor E. L. BARKHOEFER
Fairbanks Materials Representative W. L. PAIR
Transportation Supervisor B. S. McFATHER
Anchorage Warehouse: Tranship Facility Supervisor J. W. RENN
Planning & Financial Analyst J. E. STATON
Sr Contracts Engineers G. L. MINOR D. F. SHULTZ
Contracts Engineers M. L. GALBREATH G. A. RAUSCHENBERGER K. M. WELKER
Materials Controllers K. H. AIGNER G. A. BOYER R. D. CRAIN J. A. DEWING M. J. GARRETT L. A. HUDSON P. P. RENZ
T. BENTLEY—Analyst R. BREITKREUTZ—Analyst B. HARDING—Hazardous Materials C. ROWE—Household Goods
Investment Recovery Coordinator R. J. EGAN
Surplus Sales
Buyer Supervisor R. WEISER
Buyer Supervisor L. E. WILLS
Buyer Supervisor K. L. BUTCHER
Sr Buyer C. M. SUTTON
Gas Turbines Vessels Tanks Heat Exchangers
Buyer M. W. SAGE-JONES
Engineered or Custom Fabricated Equipment Steel Plate & Structural Shapes
Sr Buyer R. J. SLETTE
Tubing NDT Inspection Services Internal Coating
Purchasing Analyst B. E. SHORE
Sr Buyer G. A. GONZALEZ
Valves Fittings & Flanges
Expediter C. R. CORDERY
Expediting Assistants M. J. WIERZBICKI C. M. MILLER
Buyer A. W. WALLACE
Liner Hangers Packers Thermocase
Buyer D. K. SMILEY
Wellheads & Trees Casing
Buyer R. L. LOCKE
Rock Bits Downhole Equipment
Buyer S. G. BAILEY
Chemicals Drilling Mud Materials Vehicles Heavy Equipment Welding Gases & Supplies
Buyer L. J. LOCKMAN
Lab Equipment Janitorial Supplies Advertising Furniture Training Services
Buyer M. K. LINGLE
Pumps Compressors Seals Bearings Gaskets Packing Word Processors
Buyer L. HUDSON
Controls & Instrumentation
Buyer J. H. NELSON
Pipe Insulation Tape Hardware Building Materials Fasteners Lumber
Buyer R. T. SLAUGHTER
Communications & Computer Equipment Electronic Components
Buyer G. M. GILMAN
Motors Electrical Equipment & Supplies
Buyer P. S. BELL
Stationery Office Supplies Printing Appliances Drafting Supplies Paper Lamps
Buyer B. L. ARNOLD
Safety Equipment and Supplies Clothing Medical Supplies Wire and Cable

APPENDIX 'B'

TYPICAL EQUIPMENT LISTS

Client:
Project:
Prepared By: Revision:
Of: Date:
Case: Drilling
Note:
EQUIPMENT LIST 4204
Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Communication	Radio				
	Telex				
	Facsimile				
	VHF-FM Radio				
	Air VHF				
	UHF				
	Crane Radio				
	Loud Hailers				
	P.A.				
	Telephone				

Client:
Project:
Prepared By: Revision:
Of: Date:
Case: Drilling
Note:
EQUIPMENT LIST 4204
Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Air	Comp.				
	Receiver				
	Dryer				
	Emergency Comp.				

Client:
Project:
Prepared By: Revision:
Of: Date:
Case: Drilling
Note:
EQUIPMENT LIST 4204
Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Shop and Equipment	Welders, Etc.				
	Lathe				
	Drill				
	Threader				
	Power Tools				
	Craft Tools				
	Weld Gases				
	Building				
Spare Parts					
Heat/Vent	Fans				
	Rig Heaters				
	Hot Water Boilers				
	Dehumidifiers				
	Winterization				
	L.O. H/V				
	Waste Heat Units				

Client:
Project:
Prepared By: Revision:
Of: Date:
Case: Drilling
Note:
EQUIPMENT LIST 4204
Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Diesel	Filters				
	Centrifuge w/Pumps				
	Pumps				
	Filter/Sep.				
	Service Pumps				
Helifuel	Storage				
	Pump System				
Lube Oil	Transfer Pump				
	Purifier				
	Fresh Tank				
	Spent Tank				
Drill Water	Pumps				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST	[illegible]:
Project:	Case: Drilling		Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Electrical	Drill Gen.				
	L.Q. Gen.				
	Standby				
	Emergency				
	SCR System				
	Switch Gear				
	MCC				
	Light System				
	Cable				
	Tray				
	L.Q. MCC				
	L.Q. Emergency MCC				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST	[illegible]:
Project:	Case: Drilling		Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Buildings	Living Quarters:				
	- Bedrooms				
	- Office				
	- Control Room				
	- Radio Room				
	- Storage				
	- Galley				
	- Dining				
	- Recreation				
	- Mechanical				
	- Laundry				
	- Hospital				
	- Waiting Room				
	Pump Building				
	Generator Building				
	Toolhouse				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST	[illegible]:
Project:	Case: Drilling		Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Buildings (Cont'd)	Drillers Console Shack				
	Pipe Storage				
	Pipe Ramp Shelter				
	BOP Access. Room				
	BOP Manifold House				
	MCC Room				
	Water Treatment Room				
	Machine Shop				
	SCR Room				
	Doghouse				
	Accumulator/Gen. Room				
	Boiler Building				
	Change House				
	Warehouse				
	Tool House				
	Geologist Office				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST	[illegible]:
Project:	Case: Drilling		Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Drilling (Cont'd)	Hydraulic Unit				
	Diesel Treating				
	Light System				
	Cement System				
	- Pumps				
	- Mixer				
	- Tanks				
	- Manifold				
	Bulk System				
	- Tanks				
	- Dust Collector				
	- Compressor				
	BOP System				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST A200:
Project:	Case: Drilling	Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Drilling (Cont'd)	Mud Systems (Cont'd)				
	- Mud Pumps				
	- Cutting Washer				
	- Mud Cooling				
	- Transfer/Charge Pumps				
	- Chemical Inje.				
	Instrumentation				
	Power				
	Cranage				
	Test Units				
	- Manifold				
	- Choke				
	- H.P. Sep.				
	- L.P. Sep.				
	- Flare				
	- Burner				
	- Oil Storage				
	Heaters, Boilers				
	Waste Heat Units				
	Buildings				
	Water				
	Air				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST A200:
Project:	Case: Drilling	Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Drilling	Mast				
	Crown Block				
	Stab Board				
	Rack				
	Hook/Swivel				
	Wireline Anchor				
	Drawworks				
	Rotary Table				
	Sub-Base				
	BOP Handling				
	Drill Pipe				
	Mud Systems				
	- Mud Tanks				
	- Mud Storage				
	- Desilter				
	- Desander				
	- Degasser				
	- Chemical Mix				

Client:	Prepared By: Of:	Revision: Date:	EQUIPMENT LIST [illegible]:
Project:	Case: Drilling	Note:	Sht: of:

SYSTEM	ITEM	EQUIPMENT DESCRIPTION	QTY.	REMARKS	
Storage	Dry Bulk				
	Sack				
	Drill Water				
	Fuel				
	Pot Water				
	Casing				
	Drill String				
	Tubing				
	Lube Oil				
	Water Ballast				
	Sand Ballast				

Client:	Prepared By: BGS	Revision: 0 Date:	EQUIPMENT LIST 4536
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	% Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
		P = PSIA							
		T = oF							
		dP = P2-P1							
		Q = MMSCFD							
		L = Lower Module							
		U = Upper Module							
		D = Diameter, Day							
		R = Radius							
		M = 1,000							
		MM = 1,000,000							
		B = Barrel							
		G = Gallon							
		M = Minute							
		FG = Fuel Gas							
		CF = Cubic Feet							
		T = Tons							
		HP = Horse Power							
		LO = Lube Oil							
		CO = Crude Oil							
		SS = Stage Suction							
		SD = Stage Discharge							

Client:	Prepared By: BGS	Revision: 0 Date:	EQUIPMENT LIST 4536
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	% Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Oil/Gas	HP Sep	150 MBD	P515, T100	1	100	120 x 50	165		300
Sep'n		80 GOR							
		300 ANSI							
	MP Sep		P115, T100	1	100	120 x 50	165		200
	LP Coalescer	Electrical	P25, T150	1	100	150 x 70	195		1000
	w/Gas Sep					60 x 30	Incl.		
	Test Sep	7 MBD	P515, T100	1	100	60 x 25	60		120
	LP Heater	150 ANSI	T100-150	1	100	40 x 40	35		120

Client:	Prepared By: BGS	Revision: 0 Date:	EQUIPMENT LIST 4536
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	% Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Gas		Q P1 P2	T						
Compression	LP Unit	4 20 115	100	2	50		20 x 2		400 x 2
	HP Unit 2nd	53 110 315	100	2	50	70 x 15 x 40	160 x 2		5000 x 2
	Stage								
	3rd	90 305 2515	100	2	50	Incl.	Incl.		Incl.
	4th	315 2505 5015	100	2	50	Incl.	Incl.		Incl.
	1st SS Scrubber	150 ANSI		1	100	60 x 12	20		30
	2nd SS Scrubber	150 ANSI		1	100	60 x 14	45		30
	2nd SD Scrubber	300 ANSI		1	100	60 x 14	105		35
	3rd SD Scrubber	300 ANSI		1	100	60 x 14	105		35
	4th SS Scrubber	PD750		1	100	60 x 11	76		75

Client:	Prepared By: BGS	Revision: 0 Date:	EQUIPMENT LIST 4536
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	% Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Crude Oil	C.O. Pump	150 MBD, dP250	Electric	2	50	46 x 12 x 15	40 x 2		70 x 2
	C.O. Cooler	150 MBD, T150-100	Plate	2	25	4 x 14	15 x 4		100
	C.O. Storage	20 MBD, P15/65		2	100	2 x 2 x 4	3 x 2		15 x 2
	Pump	T40							
	Meter Prover	150 MBD w/Meter		1	100	10 x 30 x 35	60		600
		Controls, Skid							
	Scraper	12", 300 ANSI		1	100	,	10		60
	Launcher								
	C.O. Booster	150 MBD, dP50		3	50	3 x 3 x 4	7 x 3		60 x 3
	Pump								

Client:
Project:

Prepared By:BGS Revision: 0
Date:
Case: Production

EQUIPMENT LIST 4534
Note:
Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
(Cont'd)	1st GS Cooler			1	100	30 x 40	12		30
	2nd GS Cooler			1	100	30 x 40	12		30
	3rd GS Cooler			1	100	40 x 60	10		30
	4th GS Cooler			1	100	60 x 60	25		45
	1st GS Pump			1	100	2 x 2 x 4	1		5

Client:
Project:

Prepared By:BGS Revision: 0
Date:
Case: Production

EQUIPMENT LIST 4534
Note:
Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Fuel Gas	FG KO Drum	15 MMCFD		1	100	30 x 20	25		30
		300 ANSI							
	FG Exp	300 ANSI		3	100	20 x 8	3 x 3		6 x 3
	FG Heater	300 ANSI	700 to 100	1	100	60 x 60	35 x 2		30

Client:
Project:

Prepared By:BGS Revision: 0
Date:
Case: Production

EQUIPMENT LIST 4534
Note:
Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Flare/Vent	LP Flare Drum			1	100	100 x 30	10		20
	HP Flare Drum			1	100	100 x 30	20		40
	Ignition Syst			1	100		Incl.		Incl.
	HP Flare, Tip			1	100	10"	20		70
	LP Flare, Tip			1	100	10"	20		70
	Vent Stack			1	100	10"	20		50
	Flare Boom			1	100	150	700		740
	Shield, Coolant			1	100	-	-		-
	Flare Pumps			3	100	2 x 2 x 4	1 x 3		5 x 3
	Boom Burner			2	100	85	10 x 2		50 x 2

Client:
Project:

Prepared By:BGS Revision: 0
Date:
Case: Production

EQUIPMENT LIST 4534
Note:
Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Glycol/ Heat Med./ Cool Med.	Contactor	120 MMCFD 300 ANSI, TEG	P515, T100	1			115		Incl.
	Regenerator	Incl: Filter Exch., Flash Drum, Pumps, Surge Tk	Heat w/HM				230		1,200
	HM Expans'n Tk	15000 Gal					15		
	CM Expans'n Tk	15000 Gal					15		
	HM Pumps	5000 GPM, dP100		2	100	3 x 3 x 5	2 x 3		20 x 2
	CM Pumps	11600 GPM, dP 100		3	50	3 x 3 x 6	2 x 4		20 x 3
	Aux Heater								
	Glycol Storage	Tank							
	Glycol Transfer	Pumps							

Client:	Prepared By:DGS Revision: 0 Date:	EQUIPMENT LIST 4534
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Utility Water	Lift Pumps	5000 GPM, dP800	70' Shaft	3	50	3 x 3 x 5	10 x 3		200 x 3
	Coarse Filters			3	50	20 x 6	10 x 3		150 x 3
	CW Cooler	Alloy Tubes 18000 GPM	Sea T60-100 CW T130-90 P165	2	100	40 x 60	70 x 2		220
	Deaerator			2	100	120 x 40	300		1100
	Fine Filter	Sand		3	50	200 x 10	165 x 3		300 x 3
	WI Booster Pump	190 MBD, dP50		2	50	3 x 3 x 6	2 x 2		30 x 2
	WI Pump	190 MBD, dP3000	Turbine	2	50	50 x 8 x 25	90 x 2		3000 x 2
	Desalinator	15000 G/D, R.O. W/ Chlor, Dechlor, Pump		2	100	30 x 7 x 8	8 x 2		90 x 2
	Pot Wtr Tk		25M Gal	1	100	8 x 16 x 30	30		90
	Pot Wtr Bulk Tk		110M Gal	1	100	20000 CF			-
	Pot Wtr Dist	Pump		2	100	2 x 2 x 3	2		4 x 2

Client:	Prepared By:DGS Revision: 0 Date:	EQUIPMENT LIST 4534
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Wellhead	Wellheads	5000 PSI					25 x 80		150 x 80
	Wellhead Panel	(See Instr)							
	Manifolds:						400 x 2		FAB
	- Prod'n								
	- G.I.								
	- W.I.								
	- Flare								
	- Test								
	- Drill Flare								
	- Kill								

Client:	Prepared By:DGS Revision: 0 Date:	EQUIPMENT LIST 4534
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Oily Water	Prod Wtr Sep	30 MBD w/5% Oil		1	100	50 x 10	10		16
	Press Drain Sep			1	100	50 x 10	10		16
	Tilted Pl Sep			1	100	6 x 12 x 30	12		180
	Flot'n Cell			2	100	40 x 15 x 1	30		150
	Oil Sump		w/Pumps	2	100	40 x 11 x 7	150 x 2		60
	Slop Oil Pump			2	100	2 x 2 x 3	1		1
	Vacuum Sewage Unit	200 Persons		1	100	23 x 9 x 8	15		120

Client:	Prepared By:DGS Revision: 0 Date:	EQUIPMENT LIST 4534
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Air	Package	P160, 1000 CFM				45 x 20 x 8	80		600
	Including:								
	Air Comp			2	100				
	Aux. Comp			1	50				
	Air Dryer			2	100				
	Plant Air Drum			1	100				
	Inst Air Drum			1	100				
	Startup Comp			1	100				
	Startup Drum			1	100				

Client:	Prepared By:BDB Revision: 0 Date:	EQUIPMENT LIST 4/3/91
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Drilling	Drilling Pkg	(See Sheet)		2	100		4600 x 2		20000 x2
	Tub'g, Cas'g								
	Cement/Mud/Etc								
	Test Unit								
	Drill Crews	(See Crews)							

Client:	Prepared By:BDB Revision: 0 Date:	EQUIPMENT LIST 4/3/91
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Drill Rig	Rig Pkg								1350
	Mast, Substruc								1700
	Power, SCR								2000
	BOP	13 3/8" x 10000 PSI							2900
	Mud System								2350
	Drill String								1300
	Rig Tools								300
	Rig Buildings								1200
	Boilers Heating								500
	Fab'n, Rig Up								1000
	Rig Light, Elec								700
	Auxiliaries								650
	Transport, Rig Up								1050
	Other								3000
									20000 x2

Client:	Prepared By:BDB Revision: 0 Date:	EQUIPMENT LIST 4/3/91
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Diesel	Bulk Diesel Tk	1.5MM x 10MOS	Partition	1	100	256,000 CF			
	Diesel Treater	Filter, Coalescer		2	100	5 x 2 x 7	4 x 2		70 x 2
	Diesel Pumps			4	50	2 x 2 x 3	2 x 4		7 x 4
	Topping Plant								
	Diesel Day Tk	1 Day Storage							
	- Firewater			2	100	40 x 10	2 x 3		3 x 2
	- Aux Gen			2	100	70 x 20	5 x 2		1200
	- Air Comp			1	100	40 x 10	2		3
	- Turb Gen			2	100	120 x 30	15 x 2		30 x 2

Client:	Prepared By:BDB Revision: 0 Date:	EQUIPMENT LIST 4/3/91
Project:	Case: Production	Note: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Firewater	FW Pump	2000 GPM, dP200		2	100	8 x 4 x 5	10 x 2		200 x 2
		Diesel							
	FW Piping	CU-Ni							Piping
	Sprinklers,								Piping
	Controls, Etc								
	FW Jockey Pump	300 GPM, dP150		2	100	6 x 2 x 2	2 x 2		7 x 2

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST 4534
	Case: Production	Date: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
HVAC		* Ex Ducting					90*		4000**
		** w/Ducting							
	Aux Heater	(Hold)							

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST 4534
	Case: Production	Date: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Cranes	Prod'n Crane	10T @ 300 Ft		2	100	250 × 33	400 × 2		1315
	Drill Crane	10T @ 125 Ft		2	100	250 × 33	360		750
	Hoists			30			30		75
	Pedestals			3			100 × 3		FAB
	Boom Rests			3			5 × 3		FAB

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST 4534
	Case: Production	Date: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Chemical	Drum Storage								
	Bulk Tank	10 Mos Storage	3350 CF	6	100				
	Transfer Pump			4	100		1 × 5		6 × 6
	Head Tank			8	100	30 × 10	6 × 8		3 × 8
	Injec'n Pump			8	100	4 × 2 × 3	1 × 8		6 × 8

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST 4534
	Case: Production	Date: Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Lube Oil	L.O. Tank			2		20 × 20 × 12			FAB
	Used L.O. Tank			1					FAB
	L.O. Purifier			2	100	3 × 2 × 7	3 × 2		25 × 2
	L.O. Transfer Pump			2	100	2 × 2 × 3	1		4 × 2
	Drum Storage								

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST	4534
	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Safety	AFFF Tank					4 x 6 x 3			3
	AFFF Bulk Tk					10 x 6 x 6			-
	AFFF Pump	25 HP		2	100	2 x 2 x 4	1 x 2		10 x 2
	AFFF Jockey Pump	5 HP		1	100	1 x 2 x 4	1		6
	Breath Air Comp					1.5			15
	Purge Gas Bottles								
	Pickup Boat	25 HP					12		105
	Life Craft	50 Man		6		30 x 20 x 20	10 x 6		200 x 6
	Nets, Ropes, Buoys Fire Exting'rs	Buoys					5		60

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST	4534
	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Instrument-ation	Wellhead Panel					50 x 6 x 6	30		1300
	Control Centre								1300
	Fire/Gas Syst								1500
	ESD Syst								700
	Loops						45		2000
	ESD Valves						w/CV		w/CV
	Control Valves						250		2500
	Relief Valves						30		300
	Structure Monitors/ Envir. Instr.								Incl. w/ Structure

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST	4534
	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Electrical	Turb. Generator	20MW, 13.8KV	Dual Fuel	2	50	70 x 15 x 40	160 x 2		5000 x 2
	Transformers	13.8/4160/5MVA		2			200		450
		13.8/480/2.5MVA		10			Incl.		Incl.
		13.8/600/4MVA		6			Incl.		Incl.
	Switch Gear	4160	Sections	20			125		900
		480		30			Incl.		Incl.
		15000		20			Incl.		Incl.
	MCC	480	Sections	10			9		165
	Aux. Generator	1.5 MW		2	100	10 x 6 x 11	23		650
	UPS, Batteries	24V, 125V		8			15		85
	Nav. Aids			1			5		80
	Light'g & Panel						25		250

Client: Project:	Prepared By:BGS Revision: 0 Date:	EQUIPMENT LIST	4534
	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
(Cont'd)	Ground Resistor								
	Bus Duct			750'					180
	Cable, Fittings		600V-15000V						200
			480V & Less						300
	Cable Tray								850
	Tracing								
	Communications	Ext'l:Satell, HF,VF Int'l:Phone, PA							800
	House Ht Units			2			100 x 2		340 x 2

Client:	Prepared By:DGS	Revision: 0 Date:	EQUIPMENT LIST 65301
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Maintenance	Tools								
	Spares	Startup							
	Spares	1 Year							
	Steam Unit	Portable				6 x 3 x 6	5		50
	Heli Fuel Syst					25 x 6 x 6	10		100
	Fork Lift						1		10
	Laydown Area								-

Client:	Prepared By:DGS	Revision: 0 Date:	EQUIPMENT LIST 65301
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Piping	Steel								
	Cu-Ni								
	Stainless								
	Other								
	Valves								
	Fittings								
	Specials	Filters, Screens							
		Etc.							

Client:	Prepared By:DGS	Revision: 0 Date:	EQUIPMENT LIST 65301
Project:	Case: Production	Note:	Sht: of:

System	Item	Design Criteria 100%	Operating Criteria	Qty	$ Each	Size (Ft) Each	Dry Weight (KIPS)	Location	Cost M$ US
Buildings	Living Qtrs	200 Persons							5000
& Structures	-Accommodation	Furnishings					80		850
	-Office	Furnishings							
	-Control Room	(See Instrument'n)							
	-Lab	Equipment					5		50
	-Shop	Equipment					15		100
	-Storage	-							
	-Kitchen	Equipment							
	-Dining	Furnishings							
	-Mechanical	See HVAC							
	-Laundry	Equipment							
	-Recreation	Furnishings							
	-Utility	-							
	-Hospital	Equipment							
	-Radio Room	(See Communications)							
	-Waiting Room	Furnishings							
	Heli Deck						700		FAB
	Stairs/Platform								FAB
	Modules								FAB

APPENDIX 'C'

PRODUCING OIL FIELDS

BEAVER CREEK FIELD
COOK INLET BASIN, ALASKA
MARATHON OIL COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 34, T7N, R10W, SM	Marathon Oil Co., Beaver Creek Unit No. 4, API No. 50-133-20239	December 17, 1972	Beaver Creek Unit No. 4, 15,940' MD; 15,715' TVD

PRODUCING FORMATION	OIL POOL*
Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Oil Producer	Gas lift	2
	Shut-in	0
	Total	2

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	14,800
Original Pressure - psia	7552
Pressure 12/31/84 - psia	5100
Oil Gravity - °API	35
Temperature - °F	215
Net Pay - Feet	100
Original Gas/Oil Ratio - SCF/STB	280
Gas/Oil Ratio (avg. for 1984) - SCF/STB	635
Developed Area - Acres	825

ENDICOTT FIELD
ARCTIC NORTH SLOPE, ALASKA
SOHIO ALASKA PETROLEUM COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 35, T12N, R16E, UM	Sohio Sag Delta No. 4 API No. 50-029-20245	March 13, 1978	Exxon Duck Island Unit No. 1 12,800' MD; 11,320' TVD

PRODUCING FORMATION	OIL POOL
Kekiktuk	Endicott

TYPE WELL

	Status	No. of Wells
Oil	Suspended	6
Oil	Abandoned	1

RESERVOIR DATA (Preliminary)

Reference Datum - Feet Below Sea Level	10,000
Original Pressure - psia	4870
Oil Gravity - °API	23
Gas/Oil Ratio - SCF/STB (via test)	750
Temperature - °F	200-225
Gross Gas Pay - Feet	0-241
Gross Oil Pay - Feet	0-337
Porosity avg. - %	20

GRANITE POINT FIELD
COOK INLET BASIN, ALASKA
UNION OIL COMPANY OF CALIFORNIA AND
AMOCO PRODUCTION COMPANY, OPERATORS

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 13, T10N, R12W, SM	Mobil Oil Co., Granite Point No. 1, API No. 50-733-10059	June 9, 1965	Mobil Oil Corp., MUC I No. 1, 15,715' MD; 14,415' TVD

PLATFORMS SET		PRODUCING FORMATION	OIL POOL
Mobil - Granite Point	August 2, 1966	Tyonek	Middle Kenai
Amoco - Anna	May 15, 1966		
Bruce	June 4, 1966		

TYPE WELL	Method of Operation	No. of Wells (December)
Oil Producer	Flowing	0
	Gas Lift	7
	Hydraulic Pump	21
	Shut-in	3
	Subtotal	31
Service Well	Water Injection	21
	Shut-in	1
	Subtotal	22
	TOTAL	53

RESERVOIR DATA	
Reference Datum - Feet Below Sea Level	8780
Original Pressure - psia	4251
Pressure 12/31/84 - psia	1982
Saturation Pressure - psia	2400
Oil Gravity - °API	41-44
Temperature - °F	135-170
Net Pay - Feet	250-600
Porosity - %	14
Permeability - md	10
Gas/Oil Ratio - SCF/STB	1110
Gas/Oil Ratio (avg. for year 1984) SCF/STB	712
Developed Area - Acres	3200

KATALLA FIELD
GULF OF ALASKA
VARIOUS OPERATORS

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
NOT AVAILABLE	Alaska Development Co. No. 1, API No. 50-069-10004	1902	Chilkat Oil Co. No. 24, 2350' MD & TVD

PRODUCING FORMATION	OIL POOL
Katalla Fm., Burls Creek Member	Undefined - Between 360' & 1800' under Oil Claim No. 1

TYPE WELL	Method of Operation	No. of Wells (December)
Oil Producer	Abandoned	Approximately 32 in 1934

RESERVOIR DATA	
Oil Gravity - °API	40-44

PRODUCTION DATA

The Katalla Field produced 154,000 barrels from 18 of approximately 30 wells drilled from 1902 through 1930. A small refinery was built in 1911 and placed in operation in 1912. The refinery was partially destroyed by a fire in 1933 and the wells never produced after that date.

KUPARUK RIVER FIELD
ARCTIC NORTH SLOPE, ALASKA
ARCO ALASKA, INC., OPERATOR, KUPARUK RIVER UNIT
CONOCO INC., OPERATOR, MILNE POINT UNIT

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 22, T12N, R9E, UM	Sinclair Oil Corp., Sinclair BP - Ugnu No. 1, API No. 50-029-20009	April 7, 1969	Hamilton Brothers, et al, Milne Point 18-1, 11,074' MD & TVD

PRODUCING FORMATION

Kuparuk River

OIL POOL

TYPE WELL

	Method of Operations	Kuparuk River No. of Wells (December)	Undefined
Oil	Flowing	0	
	Gas Lift	179	
	Shut-in	22	
	Subtotal	201	
Injection	Gas	12	
	Shut-in-Gas	0	
	Water	20	
	Shut-in-water	8	
	Subtotal	40	
Other	Water Source		10
	Disposal		1
	TOTALS	241	11

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	6200
Original Pressure - psia	3360
Pressure 12/31/84 - psia	2880
Oil Gravity - °API	22.9-29.0
Original Gas/Oil Ratio - SCF/STB	228-413
Producing Gas/Oil Ratio (avg. for year 1984) - SCF/STB	1246
Porosity avg. - %	21
Swi avg. - %	35
Temperature - °F	150
PVF (Original) - RB/STB	1.22
Developed Area - Acres	12,800

MCARTHUR RIVER FIELD
COOK INLET BASIN, ALASKA
UNION OIL COMPANY OF CALIFORNIA, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL
Sec. 29, T9N, R13W, SM	Union Oil Co. of California, Grayling No. 1-A, API No. 50-733-10004

DISCOVERY DATE	DEEPEST TEST
October 24, 1965	Union Oil Co. of California Kustatan No. 1, 11,504' TVD

PLATFORMS SET

Union - Grayling	May 11, 1967
Marathon - Dolly Varden	July 1, 1967
ARCO - King Salmon	June 3, 1967

OIL POOLS*

PRODUCING FORMATION

TYPE WELL	Method of Operation		Tyonek Middle Kenai "G"	Hemlock Cgl. Hemlock	W. Foreland W. Foreland
			No. of Completions (December)		
Oil Producer	Flowing		0	0	0
	Gas Lift		8	55	3
	Shut-in		6	4	0
		Subtotal	14	59	3
Injection Well	Water		3	14	0
	Shut-in		0	8	0
		Subtotal	3	22	0
		TOTAL	17	81	3

RESERVOIR DATA

	Middle Kenai "G"	Hemlock	W. Foreland
Reference Datum - Feet Below Sea Level	8850	9350	9650
Original Pressure - psia	4009	4250	4457
Pressure 12/31/84 - psia (avg.)	3050	3940	2800
Saturation Pressure - psia (avg.)	1826	1787	1186
Oil Gravity - °API	35.6	35.4	32.9
Temperature - °F	163	180	185
Net Pay - Feet	100	290	100
Porosity avg. - %	18.1	10.5	15.7
Permeability avg. - md	65	53	102
Original Gas/Oil Ratio - SCF/STB	297	404	271
Gas/Oil Ratio (avg. for year 1984) - SCF/STB	405	512	535
FVF @ Orig. Pressure - RB/STB	1.23	1.25	1.19
FVF @ Sat. Pressure - RB/STB	1.26	1.28	1.22
Swi - %	35	35 (Est.)	NA -
Oil Viscosity @ Orig. Pressure - cp.	1.088	1.190	1.497
Oil Viscosity @ Sat. Pressure - cp.	0.888	0.960	1.130
Developed Area - Acres	2490	12,400	1515

MIDDLE GROUND SHOAL FIELD
COOK INLET BASIN, ALASKA
SHELL WESTERN EXPLORATION AND PRODUCTION, INC. AND
AMOCO PRODUCTION COMPANY, OPERATORS

DISCOVERY LOCATION

Sec. 19, T9N, R12W, SM

DISCOVERY WELL

Pan American Petroleum Corp.,
Middle Ground Shoal State
No. 1, API 50-733-10067

DISCOVERY DATE

June 10, 1962

DEEPEST TEST

Amoco - South MGS Unit No. 6,
10,942' MD; 10,931' TVD

PLATFORMS SET

Shell - "A"	August 16, 1964
"C"	April 26, 1967
Amoco - Dillon	October 9, 1965
Baker	June 22, 1965

OIL POOLS*

		PRODUCING FORMATION		
		Tyonek	Tyonek	Tyonek/ Hemlock Cgl.
		"A" Pool	"B, C & D" Pools	"E, F & G" Pools
TYPE WELL	Method of Operation	No. of Completions (December)		
Oil Producer	Flowing	0	0	0
	Gas Lift	0	2	22
	Hydraulic Pump	0	2	14
	Shut-in	4	1	7
	Subtotal	4	5	43
Injection	Water	0	2	17
	Shut-in	2	0	2
	Subtotal	2	2	19
	TOTAL	6	7	62

RESERVOIR DATA

	"A" Pool	"B, C & D" Pools	"E, F & G" Pools
Reference Datum - Feet Below Sea Level	5500	6000	8500
Original Pressure - psia	2508	2768	4220
Pressure avg. 12/31/84 - psia	2500	1900	2325
Saturation Pressure - psia	NA	1900	1500
Oil Gravity - °API	42	36-38	36-38
Temperature - °F	128	130	155
Net Pay - Feet	190	335	500
Porosity - %	16	16	11
Permeability - md	15	15	10
Gas/Oil Ratio - SCF/STB (Original)	3850	650	381
Gas/Oil Ratio (avg. for year 1984) - SCF/STB	NA	904	662
Developed Area - Acres	740	740	4000

PRUDHOE BAY FIELD
ARCTIC NORTH SLOPE, ALASKA
ARCO ALASKA, INC., OPERATOR, EAST AREA
SOHIO ALASKA PETROLEUM COMPANY, OPERATOR, WEST AREA

DISCOVERY LOCATION

Sec. 10, T11N, R14E, UM

DISCOVERY WELL

Atlantic Richfield, Prudhoe Bay
State No. 1, API No. 50-029-20001

DISCOVERY DATE

December 19, 1967

DEEPEST TEST

BP Alaska Inc., Sag Delta
No. 31-10-16; 13,877' MD & TVD

PRODUCING FORMATIONS

		Kuparuk River	Sag River Shublik Ivishak	Wahoo Alapah
OIL POOLS		P.B.Kuparuk R.	Prudhoe	Lisburne
TYPE WELL	Method of Operation	No. of Wells (December)		
Oil Producer	Flowing	0	448	0
	Gas lift	0	29	0
	Shut-in	0	94	4
	Suspended	0	21	3
	Subtotal	0	592	7
Injection	Gas	0	28	0
	Shut-in Gas Injection	0	1	0
	Water	0	68	0
	Shut-in Water Injection	0	5	0
	Subtotal	0	102	0
	TOTAL	0	694	7

RESERVOIR DATA

	P.B.Kuparuk R.	Prudhoe	Lisburne
Reference Datum - Feet Below Sea Level	6200	8800	8900
Original Pressure - psia	3210	4390	4490
Pressure 12/31/84 - psia	3210	3900	4490
Saturation Pressure - psia	2980	4390	4300
Oil Gravity - °API	23	28	27
Temperature - °F	150	200	183
Gross Pay - Feet	40-95	350-630	0-2000
Net Pay - Feet	30-80	0-444	NA
Porosity - %	23	22	10
Permeability - md	3-200	265	0.1-2.0
Original Gas/Oil Ratio - SCF/STB	450	730	830
Producing Gas/Oil Ratio (avg for year 1984) - SCF/STB	NA	1678	NA
Original FVF - RB/STB	1.27	1.40	1.385
Swi - %	28-47	20.77	20-40
Oil Viscosity @ Orig. Pressure - cp.	1.8-4.0	0.81	0.7
Oil Viscosity @ Sat. Pressure - cp.	NA	0.81	NA
Developed Area - Acres	NA	151,000	122,880
Well Spacing - Acres	NA	unlimited	160

REDOUBT SHOAL FIELD
COOK INLET BASIN, ALASKA
AMOCO PRODUCTION COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 19, T7N, R13W, SM	Pan American Petroleum Corp., Redoubt Shoal Unit No. 2, API No. 50-733-20040-01	September 21, 1968	Union Oil Co. of California, Redoubt Bay Unit No. 1, 14,855' MD; 13,632' TVD

PRODUCING FORMATION	OIL POOL
Hemlock Cgl.	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Oil Producer	Shut-in (Since 1968)	1

RESERVOIR DATA

Oil Gravity - °API	28.1
Gas/Oil Ratio - SCF/STB	286
Productive Area - Acres	160

SWANSON RIVER FIELD
KENAI PENINSULA, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE
Sec. 10, T8N, R9W, SM	Richfield Oil Corp. SRU No. 1, API No. 50-133-10136, (Now Chevron U.S.A. Inc. SRU 34-10)	July 19, 1957

DEEPEST TEST	PRODUCING FORMATION	OIL POOL
SCU 33-33, 17,689'MD; 17,684 TVD	Hemlock Cgl.	Hemlock

TYPE WELL	Method of Operation	No. of Wells (December)
Oil Producer	Flowing	29
	Gas Lift	10
	Shut-in	26
	Subtotal	65
Injection	Water	0
	Shut-in	2
	Gas	8
	Shut-in	4
	Subtotal	14
	Total	79

RESERVOIR DATA

	Swanson Riv. Unit		Soldotna Creek Unit
	34-10 Block	Center Block	SCU Block
Reference Datum - Feet Below Sea Level	10,780	10,560	10,300
Original Pressure - psia	5700	5700	5550
Pressure 12/31/84 - psia	4263	3669	4882
Bubble Point Pressure - psia	1050	1140	1350
Oil Gravity - °API	30	30	36.5
Original Gas/Oil Ratio - SCF/STB	175	175	350
Original FVF - RB/STB	1.173	1.235	1.295
Net Pay - Feet	75	70	220
Porosity avg. - %	21	20	20-24
Permeability avg. - md	55	75	40-360
Swi - %	40	40	40
Temperature - °F	180	180	180
Developed Area - Acres	478	NA	7660

TRADING BAY FIELD
COOK INLET BASIN, ALASKA
MARATHON OIL COMPANY, UNION OIL COMPANY OF CALIFORNIA AND TEXACO INC., OPERATORS

DISCOVERY LOCATION

Sec. 4, T9N, R13W, SM

DISCOVERY WELL

Union Oil Co. of California,
Trading Bay No. 1-A,
API No. 50-733-10052

DISCOVERY DATE

June 17, 1965

DEEPEST TEST

ARCO Alaska, Inc.,
Trading Bay St. No. 1,
10,950' MD & TVD

PLATFORMS SET

Union - Monopod	June 15, 1966
Texaco - Sup-TS"A"	April, 15, 1968
ARCO - Spark	July 19, 1968

PRODUCING FORMATION

		Tyonek Middle Kenai					Hemlock Cgl.	Tyonek/ Hemlock Cgl.
OIL POOLS		Undefined	"B"	"C"	"D"	"E"	Hemlock	"G" & Hemlock N.E. Commingled
TYPE WELL	Method of Operation	No. of Completions (December)						
Oil Producer	Flowing	0	0	0	0	0	0	0
	Gas Lift	1	7	4	8	5	6	6
	Submersible	0	0	0	0	0	0	0
	Shut-in	2	1	4	3	2	3	1
	Subtotal	3	8	8	11	7	9	7
Injection well	Water Inj.	0	0	1	2	0	0	0
	Shut-in	0	0	3	0	0	0	0
	Subtotal	0	0	4	2	0	0	0
	TOTAL	3	8	12	13	7	9	7

RESERVOIR DATA

	Undefined	"B"	"C"	"D"	"E"	Hemlock	"G" & Hemlock N.E. Commingled
Reference Datum - Feet Below Sea Level			4400	5628		6100	9800
Original Pressure - psia			2037	2637		2802	4420
Pressure 12/31/84 - psia			1564	1904		2000	2000
Saturation Pressure - psia				1921		1622	1780
Oil Gravity - °API			28.0	28.0		31.1	35.8-36.2
Temperature - °F				112		136	180
Gross Pay - Feet							400
Net Pay - Feet				100-1000		300	215
Porosity - %				16.5-24		14.6	11.5
Permeability - md				250		10	12
Original Gas/Oil Ratio - SCF/STB				268		318	275
Gas/Oil Ratio (avg. for year 1984) - SCF/STB	279	954	618	1262	1553	790	288
Original FVF - RB/STB							1.29
Swi - %							36
Oil Viscosity @ Original Pressure cp.							1.036
Developed Area - Acres				1400		1200	500

UMIAT FIELD
ARCTIC NORTH SLOPE, ALASKA
BUREAU OF LAND MANAGEMENT
U.S. DEPARTMENT OF THE INTERIOR, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 3, T1S, R1W, UM	U.S. Navy, Umiat Test No. 3, API No. 50-287-10003	December 26, 1946	USGS/Husky Seabee No. 1, 15,611' MD & TVD

PRODUCING FORMATION	OIL POOL
Grandstand	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Oil Producer	Shut-in (Since 1951)	3

RESERVOIR DATA	PRODUCTION DATA
None Available	None Available

UNNAMED FIELD
POINT THOMSON UNIT AREA
ARCTIC NORTH SLOPE, ALASKA
EXXON CORPORATION, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELLS	DISCOVERY DATES	DEEPEST TEST
Sec. 27, T10N, R24E, UM	Alaska State A-1 API No. 50-089-20003	September 11, 1975	Exxon Alaska State G-2, TD 16,505' MD; 14,340' TVD
Sec. 32, T10N, R23E, UM	Pt. Thomson Unit No. 1 API No. 50-089-20005	October 30, 1977	

PRODUCING FORMATIONS	OIL POOLS
Thomson Sand	Undefined

TYPE WELL

	Status	No. of Wells
Gas	Suspended	4
Oil and Gas	Suspended	3

RESERVOIR DATA	Alaska St. A-1	Pt. Thomson Unit No. 1
Reference Datum - Feet Below Sea Level	12,500	12,900
Original Pressure - psia	9850	10,160 (est.)
Oil Gravity - °API	23.1	18.4
Gas/Oil Ratio SCF/STB (test)	864-934	5830
Temperature - °F	195	205

UNNAMED FIELD
SEAL ISLAND AREA
ARCTIC NORTH SLOPE, ALASKA
SHELL WESTERN EXPLORATION AND PRODUCTION, INC., ET AL

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 11, T13N, R13E, UM	Seal Island BF-47 No. 1, API No. 50-029-20954	Not Available	BF-47 No. 1 14,541' MD; 12,461' TVD

PRODUCING FORMATION	OIL POOL
Sadlerochit	Undefined

TYPE WELL

	Status	No. of Wells
Oil	Suspended	3

RESERVOIR DATA (Preliminary)	
Reference Datum - Feet Below Sea Level	NA
Original Pressure - psia	NA
Oil Gravity - °API	40
Gas/Oil Ratio - SCF/STB (via test)	NA
Temperature - °F	NA

APPENDIX 'D'

PRODUCING GAS FIELDS

ALBERT KALOA FIELD
COOK INLET BASIN, ALASKA
AMOCO PRODUCTION COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 26, T11N, R12W, SM	Pan American Petroleum Corp., Albert Kaloa No. 1, API No. 50-283-20006	January 4, 1968	Albert Kaloa No. 1, 13,600' MD & TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Suspended	1
	Abandoned	1

RESERVOIR DATA

Not Available

BEAVER CREEK FIELD
COOK INLET BASIN, ALASKA
MARATHON OIL COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sep. 34, T7N R10W, SM	Marathon Oil Co. Beaver Creek Unit No. 1, API No. 50-133-10042	February 10, 1967	Beaver Creek Unit No. 4, 15,940' MD, 15,715' TVD

PRODUCING FORMATION	GAS POOL
Sterling and Beluga	Undefined

TYPE WELL

	Method of Operation		No. of Wells (December)
Gas Producer	Flowing		4
	Shut-in		1
		Subtotal	5
Injection	Shut-in		1
		TOTAL	6

RESERVOIR DATA	Sterling	Beluga
Reference Datum - Feet Below Sea Level	5000	8100
Original Pressure - psia	2200	3800
Pressure 12/31/84 - psia	2080	ORIG
Gas Specific Gravity	0.560	NA
Temperature -oF	107	142
Gross Pay - Feet	125	20
Net Pay - Feet	110	20
Porosity - %	30	10
Permeability	2000	NA
Swi - %	40	NA
Developed Area - Acres	3165	640

BELUGA RIVER FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 35, T13N, R10W, SM	Standard Oil Co. of California, Beluga River Unit No. 1, (Now Chevron U.S.A. Inc., Beluga River Unit No. 212-35) API No. 50-283-10027	December 1, 1962	Beluga River Unit No. 212-35 16,428' MD & TVD

PRODUCING FORMATIONS		GAS POOL
Sterling	Beluga	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	10
	Shut-in	0
	TOTAL	10

RESERVOIR DATA	Sterling	Beluga
Reference Datum - Feet Below Sea Level	3300	4500
Original Pressure - psia	1635	2215
Pressure avg. 12/31/84 - psia	1438	1562
Gas Specific Gravity	0.556	0.556
Temperature - °F	94	106
Net Pay - Feet	107	106
Porosity - %	31	24
Swi - %	37	42
Developed Area - Acres	5115	4826

BIRCH HILL FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 25, T9N, R9W, SM	Standard Oil Co. of California, Birch Hill Unit No. 22-25, API No. 50-133-10029	June 14, 1965	Birch Hill Unit No. 22-25, 15,500' MD & TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1965)	1

RESERVOIR DATA	
Reference Datum - Feet Below Sea Level	7960
Original Pressure - psia	3840
Pressure 12/31/84 - psia	3715
Bubble Point Pressure - psia	3563
Gas Specific Gravity	0.561
Temperature - °F	136
Net Pay - Feet	31
Porosity avg. - %	25
Permeability avg. - md	5-6
Productive Area - Acres	150

EAST BARROW FIELD
ARCTIC NORTH SLOPE, ALASKA
NORTH SLOPE BOROUGH, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 26, T22N, R17W, UM	U.S. Navy, South Barrow No. 12, API No. 50-023-20006	May 4, 1974	South Barrow No. 17, 2382' MD & TVD

PRODUCING FORMATION	GAS POOL
Unnamed Jurassic	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	4
	Shut-in	1
	Suspended	1
	TOTAL	6

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	2000
Original Pressure - psia	1000
Pressure 12/31/84 - psia	835
Gas Specific Gravity	0.57
Temperature - °F	58
Net Pay - Feet	18
Porosity - %	22
Permeability - md	44
Swi - %	55
Developed Area - Acres	1800 (est.)

EAST UMIAT FIELD
ARCTIC NORTH SLOPE, ALASKA
MCCULLOCH OIL CORPORATION OF CALIFORNIA, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 19, T1S, R2E, UM	BP Exploration Co. (Alaska), Inc., East Umiat Unit Well No. 1, API No. 50-287-10016	March 28, 1963	East Umiat Unit No. 1, 3347' MD & TVD

PRODUCING FORMATION	GAS POOL
Ninuluk/Chandler	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1964)	1
	Suspended	1
	Total	2

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	1929
Original Pressure - psia	750
Pressure 12/31/84 - psia	750
Gas Specific Gravity	0.600
Temperature - °F	50
Gross Pay - Feet	73
Net Pay - Feet	66
Porosity - %	15.4
Permeability - md	15
Swi - %	32
Productive Area - Acres	NA

KAVIK FIELD
ARCTIC NORTH SLOPE, ALASKA
ARCO ALASKA, INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 7, T3N, R23E, UM	Pan American Petroleum Corp., Kavik No. 1, API No. 50-179-20001	November 2, 1969	Kavik No. 1, 9564' MD & TVD

PRODUCING FORMATION	GAS POOL
Sag River/Sadlerochit	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Suspended	1
	Abandoned (1984)	1
	TOTAL	2

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	3500
Original Pressure - psia	2391-2400
Pressure 12/31/84 - psia	2391-2400
Gas Specific Gravity	0.587-0.588
Temperature - °F	114-127
Gross Pay - Feet	260-900
Net Pay - Feet	40-280
Porosity - %	5-13
Permeability - md	2-200
Swi - %	50
A.O.F.	10,500 MCFG/D
Productive Area - Acres	1280

KEMIK FIELD
ARCTIC NORTH SLOPE, ALASKA
FOREST OIL CORPORATION, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 17, T1N, R20E, UM	Forest Oil Corp., Kemik Unit No. 1, API No. 50-223-20006	June 17, 1972	Kemik Unit No. 1, 16,073' MD & TVD

PRODUCING FORMATION	GAS POOL
Shublik	Undefined

TYPE WELL

	Method of Operation	No of Wells (December)
Gas Producer	Shut-in (Since 1972)	1

RESERVOIR DATA

Original Pressure - psia	2678
Pressure 12/31/84 - psia	2678
Gas Specific Gravity	0.600
Temperature - °F	123
Productive Area - Acres	640

FALLS CREEK FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 6, T1N, R12W, SM	Standard Oil Co. of California, Falls Creek Unit No. 1, (Now Chevron U.S.A. Inc. Falls Creek Unit No. 43-1) API No. 50-133-10005	June 25, 1961	Falls Creek Unit No. 1, 13,795' MD; 13,383' TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1961)	1

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	7045
Original Pressure - psia	3404
Pressure 12/31/84 - psia	3374
Gas Specific Gravity	0.600
Temperature - °F	132

IVAN RIVER FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., ALASKA

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 1, T13N, R9W, SM	Standard Oil Co. of California, Ivan River Unit No. 44-1, API No. 50-283-10008	October 8, 1966	Ivan River No. 44-1, 15,269' MD & TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1966)	1
	Suspended	1
	TOTAL	2

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	7800
Original Pressure - psia	4130
Pressure 12/31/84 - psia	4130
Gas Specific Gravity	0.560
Temperature - °F	128
Gross Pay - Feet	95
Net Pay - Feet	37
Porosity avg. - %	20
Permeability avg. - md	1600
Swi - %	45
Productive Area - Acres	2418

KENAI FIELD
COOK INLET BASIN, ALASKA
UNION OIL COMPANY OF CALIFORNIA, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 6, T4N, R11W, SM	Union Oil Co. of California, Kenai Unit No. 14-6, API No. 50-133-10089	October 11, 1959	Kenai Unit No. 14-6, 15,047' MD & TVD

PRODUCING FORMATION		Sterling					Beluga	Tyonek
GAS POOLS		Sterling					Undefined	Tyonek
		3	4	5.1	5.2	6		
TYPE WELL	**Method of Operation**	No. of Completions (December)						
Gas Producer	Flowing	9	14	12	*0	12	5	4
	Shut-in	2	2	2	0	0	0	0
	TOTAL	11	16	14	0	12	5	4

*Sterling 5.2 completion was abandoned December, 1981.

RESERVOIR DATA

	3	4	5.1	5.2	6	Beluga Undefined	Tyonek
Reference Datum - Feet Below Sea Level	3700	3960	4025	4125	4565	4992	9000
Original Pressure - psia	1862	1919	1981	2078	2505	2558	4416
Pressure 12/31/84 - psia (Est.)	875	887	905	1264	930	1240	1125
Gas Specific Gravity	0.557	0.557	0.557	0.557	0.557	0.555	0.560
Temperature - °F	103	105	105	106	109	115	143
Net Pay - Feet	88	60	113	53	110	213	100
Porosity avg. - %	35.5	36.5	36.5	36.5	32	15-20	18-22
Swi - %	35	35	35	35	40	40	40
Developed Area - Acres	5052	7562	6198	1796	5432	1280	2840

LEWIS RIVER FIELD
COOK INLET BASIN, ALASKA
CITIES SERVICE OIL AND GAS CORPORATION, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 2, T14N, R9W, SM	Cities Service Oil Co., Lewis River No. 1, API No. 50-283-20047	September 2, 1975	Lewis River No. 1, 9480' MD & TVD

PRODUCING FORMATION	GAS POOL
Beluga	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	2
	Shut-in	0
	TOTAL	2

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	4700
Original Pressure - psia	2760 (Avg.)
Pressure 12/31/84 - psia	2750
Temperature - °F	111 (Est.)
Net Pay - Feet	85
Productive Area - Acres	1030

MCARTHUR RIVER FIELD
COOK INLET BASIN, ALASKA
UNION OIL COMPANY OF CALIFORNIA, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 28, T9N, R13W, SM	Union Oil Co. of California, Trading Bay Unit G-18, API No. 50-733-20160	December 2, 1968	Shell Forelands Channel No. 1, 11,786' MD; 11,736' TVD

PRODUCING FORMATION

Tyonek

GAS POOL		Middle Kenai	Undefined
TYPE WELL	**Method of Operation**	**No. of Completions (December)**	
Gas Producer	Flowing	3	2
	Shut-in	0	0
	Total	3	2

RESERVOIR DATA	Middle Kenai	Undefined
Original Pressure - psia	1734	NA
Pressure 12/31/84 - psia	1960	1655
Gas Specific Gravity	0.564	NA
Temperature - °F	117	110
Developed Area - Acres	1920	1280

MIDDLE GROUND SHOAL FIELD
COOK INLET BASIN, ALASKA
AMOCO PRODUCTION COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 30, T9N, R12W, SM	Amoco Production Co., Middle Ground Shoal 17595 No. 14, API No. 50-733-20084	February 14, 1982	MGS State 18746 No. 1, 10,298' MD & TVD

PLATFORM SET	PRODUCING FORMATION	GAS POOL
Amoco-Baker June 22, 1965	Tyonek	Undefined

TYPE WELL	Method of Operations	No. of Wells (December)
Gas Producer	Flowing	1

RESERVOIR DATA (Preliminary)	
Reference Depth - TVD	3550
Perforations - MD	4612 - 4637
Original Pressure - psia	1428
Pressure 12/31/84 - psia	1290
Gas Specific Gravity	.564
Temperature - °F	130

MOQUAWKIE FIELD
COOK INLET BASIN, ALASKA
SIMASCO PRODUCTION COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 1, T11N, R12W, SM	Socony Mobil Oil Co., Inc., Mobil-Atlantic Moquawkie No. 1, API No. 50-283-10019	November 28, 1965	Mobil-Atlantic Moquawkie No. 1, 11,364' MD & TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1979)	2
	Abandoned	1

RESERVOIR DATA

Original Pressure - psia	1260-2305
Gas Specific Gravity	0.600
Temperature - °F	80-108
Gross Pay - Feet	72-172
Net Pay - Feet	45-108
Porosity - %	20-24
Swi - %	35-40
Productive Area - Acres	1280

NICOLAI CREEK FIELD
COOK INLET BASIN, ALASKA
TEXACO INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 30, T11N, R12W, SM	Texaco, Inc., Nicolai Creek State No. 1-A, API No. 50-283-10020-01	May 12, 1966	Nicolai Creek No. 4, 12,744' MD; 11,950' TVD

PRODUCING FORMATION	GAS POOL
Beluga/Tyonek	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in	3

RESERVOIR DATA

Reference Depth - TVD	3400-2170
Original Pressure - psia	1688-1062
Pressure 12/31/84 - psia	1354-900
Gas Specific Gravity	0.575
Temperature - °F	110-105
Net Pay - Feet	33

NORTH COOK INLET FIELD
COOK INLET BASIN, ALASKA
PHILLIPS PETROLEUM COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 6, T11N, R9W, SM	Pan American Petroleum Corp., Cook Inlet St. 17589 No. 1, API No. 50-883-10012	August 22, 1962	Shell North Cook Inlet State No. 1, 14,850' MD & TVD

PLATFORM SET	PRODUCING FORMATION	GAS POOL
Phillips - "A" June 19, 1968	Sterling/Beluga	Tertiary Series

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	12
	Shut-in	0
	TOTAL	12

RESERVOIR DATA	Sterling	Beluga
Reference Datum - Feet Below Sea Level	4200	5100
Original Pressure - psia	2040	2478
Pressure 12/31/84 - psia (Commingled production)	1524	1524
Gas Specific Gravity	0.566	0.566
Temperature - °F	109	119
Gross Pay - Feet	317	250
Net Pay - Feet	130	30
Porosity - %	28	28
Permeability - md	178	175
Swi - %	40	40
Developed Area - Acres	8300	2500

NORTH FORK FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 35, T4S, R14W, SM	Standard Oil Co. of California, North Fork Unit No. 41-35, API No. 50-231-10004	December 20, 1965	North Fork Unit No. 41-35, 12,812' MD & TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1965)	1

RESERVOIR DATA	
Reference Datum - Feet Below Sea Level	7200
Original Pressure - psia	3410
Pressure 12/31/84 - psia	2992
Gas Specific Gravity	0.562
Temperature - °F	140
Gross Pay - Feet	40
Porosity - %	18
Permeability - md	3.5
Swi - %	50
Productive Area - Acres	50

SOUTH BARROW FIELD
ARCTIC NORTH SLOPE, ALASKA
NORTH SLOPE BOROUGH, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 14, T22N, R18W, UM	U.S. Navy, South Barrow No. 2, API No. 50-023-10010	April 15, 1949	South Barrow No. 4, 2538' MD & TVD

PRODUCING FORMATION	GAS POOL
Unnamed Jurassic	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	6
	Shut-in	0
	Suspended	1
	TOTAL	7

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	2250
Original Pressure - psia	1103
Pressure 12/31/84 - psia	662
Gas Specific Gravity	0.56
Temperature - °F	63
Net Pay - Feet	27
Porosity - %	20
Permeability - md	30
Swi - %	52
Developed Area - Acres	3500

NORTH MIDDLE GROUND SHOAL FIELD
COOK INLET BASIN, ALASKA
AMOCO PRODUCTION COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 8, T9N, R12W, SM	Pan American Petroleum Corp., MGS State No. 6, (Now MGS State 18743 No. 1) API No. 50-733-10032	November 15, 1964	MGS State 18743 No. 1, 10,709' MD; 10,544' TVD

PRODUCING FORMATION	GAS POOL
Upper Kenai	North Middle Ground Shoal Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Abandoned 1975	1

RESERVOIR DATA

Original Pressure - psia	4190
Temperature - °F	144
Net Pay - Feet	24

STUMP LAKE FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 33, T14N, R8W, SM	Chevron U.S.A. Inc., Stump Lake Unit No. 41-33, API No. 50-283-20055	May 1, 1978	Stump Lake Unit No. 41-33, 11,650' MD & TVD

PRODUCING FORMATION	GAS POOL
Beluga	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Suspended	1

RESERVOIR DATA	
Reference Depth - TVD	6700
Original Pressure - psia	3290-3460
Gas Specific Gravity	.565
Temperature - °F	106
Gross Pay - Feet	78

STERLING FIELD
COOK INLET BASIN, ALASKA
UNION OIL COMPANY OF CALIFORNIA, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 15, T5N, R10W, SM	Union Oil Co. of California, Sterling Unit No. 23-15, API No. 50-133-10012	August 4, 1961	Sterling Unit No. 23-15, 14,832' MD & TVD

PRODUCING FORMATION	GAS POOL
Sterling	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	1
	Shut-in (Since 1966)	1
	TOTAL	2

RESERVOIR DATA	
Reference Datum - Feet Below Sea Level	5030
Original Pressure - psia	2200
Pressure 12/31/84 - psia	2035
Gas Specific Gravity	0.569
Temperature - °F	109
Net Pay - Feet	20
Porosity avg. - %	26
Swi - %	40
Developed Area - Acres	1540

SWANSON RIVER FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 10, T8N, R9W, SM	Standard Oil Co. of California, SRU 32-10, (Now Chevron U.S.A. Inc., SRU 212-10) API No. 50-133-10135	May 18, 1960	SCU No. 33-33, 17,689' MD; 17,684' TVD

PRODUCING FORMATION	GAS POOL
Sterling ("B", "D", & "E" Sands)	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	0
	Shut-in (Since 1962)	4
	Total	4

RESERVOIR DATA

Reference Datum - Feet Below Sea Level	2870-7500
Original Pressure - psia	1335-4500
Pressure 12/31/84 - psia	1128-2566
Gas Specific Gravity	0.600
Temperature - °F	123
Porosity avg. - %	30
Permeability avg. - md	650
Swi - %	35
Productive Area - Acres	640

THEODORE RIVER FIELD
COOK INLET BASIN, ALASKA
CHEVRON U.S.A. INC., OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 33, T14N, R9W, SM	Chevron U.S.A. Inc., Pretty Creek Unit No. 2, (Formerly Halbouty Theodore River No. 1), API No. 50-283-20022	February 20, 1979	Halbouty Theodore River No. 1, 12,025' MD & TVD

PRODUCING FORMATION	GAS POOL
Beluga	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Suspended	1

RESERVOIR DATA

Reference Depth - TVD	3700
Original Pressure - psia	1681-1903
Gross Pay - Feet	90

TRADING BAY FIELD
COOK INLET BASIN, ALASKA
MARATHON OIL COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 34, T10N, R13W, SM	Texaco Inc. T/S No. 3RD, (Now N. Trading Bay Unit T/S No. 3RD), API No. 50-733-20133	October 5, 1979	ARCO Alaska, Inc. Trading Bay St. No. 1, T.D. 10,950' MD & TVD

PLATFORM SET	PRODUCING FORMATION	GAS POOL
Texaco-Superior T/S "A" April 15, 1968	Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	1
	Shut-in	0
	Total	1

RESERVOIR DATA

Reference Depth - TVD	9000
Original Pressure - psia	3910
Pressure 12/31/84 - psia	3850
Gas Specific Gravity	0.582
Temperature - °F	175
Net Gas Pay - Feet	60
Productive Area - Acres	640

WEST FORELAND FIELD
COOK INLET BASIN, ALASKA
AMOCO PRODUCTION COMPANY, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 21, T8N, R14W, SM	Pan American Petroleum Corp., West Foreland No. 1, API No. 50-133-10028	March 27, 1962	West Foreland No. 1, 13,500' MD & TVD

PRODUCING FORMATION	GAS POOL
Tyonek	Undefined

TYPE WELL

	Method of Operation	No. of Wells (December)
Gas Producer	Shut-in (Since 1962)	1

RESERVOIR DATA

Original Pressure - psia	4265
Gas Specific Gravity	0.600
Temperature - °F	171
Net Pay - Feet	26
Productive Area - Acres	640

WEST FORK FIELD
COOK INLET BASIN, ALASKA
ENSTAR CORPORATION, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 21, T6N, R9W, SM	Halbouty Alaska Oil Co., Alaska Oil & Mineral, King Oil, Inc. No. 1-B, API No. 50-133-10019	September 26, 1960	Alaska Oil & Mineral, King Oil Inc. No. 1-B, 14,019' MD & TVD

PRODUCING FORMATION	GAS POOL
Sterling	Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Flowing	1

RESERVOIR DATA

Original Pressure - psia	2037
Pressure 12/31/84 - psia	1900
Gas Specific Gravity	0.560
Temperature - °F	110
Gross Pay - Feet	47
Net Pay - Feet	22
Porosity - %	30
Permeability - md	4400
Developed Area - Acres	455

UNNAMED FIELD
CANNERY LOOP UNIT AREA
COOK INLET BASIN, ALASKA
UNION OIL COMPANY OF CALIFORNIA, OPERATOR

DISCOVERY LOCATION	DISCOVERY WELL	DISCOVERY DATE	DEEPEST TEST
Sec. 8, T5N, R11W, SM	Union Oil Co. of California, Cannery Loop Unit No. 1, API No. 50-133-20323	May 16, 1979	Cannery Loop Unit No. 3, TD 11,125' MD; 10,552' TVD

PRODUCING FORMATIONS	GAS POOLS
Beluga and Tyonek	5 Undefined

TYPE WELL	Method of Operation	No. of Wells (December)
Gas Producer	Suspended	2

RESERVOIR DATA

Original Pressure - psia	4000 at 10,000 TVD
Gas Specific Gravity	0.56
Temperature - °F	126
Net Pay - Feet	90
Productive Area - Acres	1280

APPENDIX 'E'

PRODUCTION FLOW DIAGRAM & SYSTEMS

NOTE: The flow diagrams in this section illustrate process, systems which are typical for application in the Alaska environment.

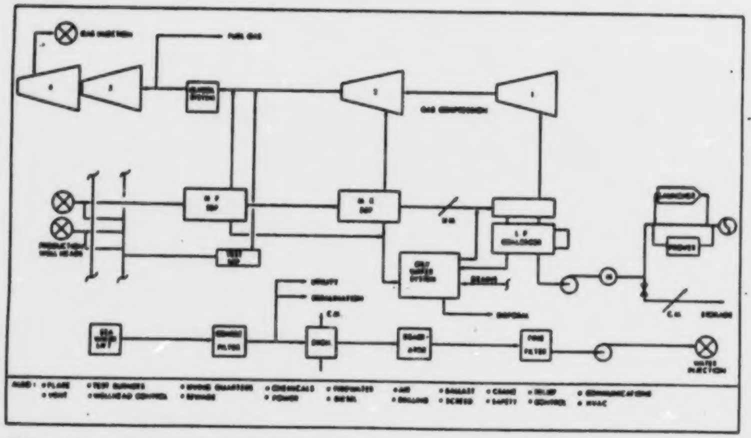

GAS INJECTION
FUEL GAS
GLYCOL SYSTEM
4
3
2
1
GAS COMPRESSION
H.P. SEP
M.P. SEP
TEST SEP
PRODUCTION WELL HEADS
H.M.
L.P. COALESCER
LAUNCHER
PROVER
OILY WATER SYSTEM
DRAINS
DISPOSAL
C.M.
STORAGE
UTILITY
CHLORINATION
C.M.
SEA WATER LIFT
COARSE FILTER
DEOX
DEAERATOR
FINE FILTER
WATER INJECTION
AUX: • FLARE • VENT
• TEST BURNERS • WELLHEAD CONTROL
• LIVING QUARTERS • SEWAGE
• CHEMICALS • POWER
• FIREWATER • DIESEL
• AIR • DRILLING
• BALLAST • SCREED
• CRANE • SAFETY
• RELIEF • CONTROL
• COMMUNICATIONS • HVAC

FIGURE E 1 PRODUCTION : BLOCK FLOW DIAGRAM

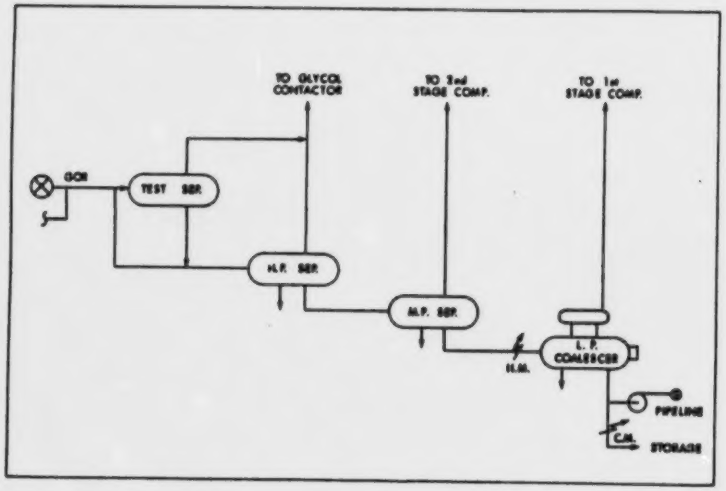

GOR
TEST SEP.
TO GLYCOL CONTACTOR
H.P. SEP.
TO 2nd STAGE COMP.
M.P. SEP.
TO 1st STAGE COMP.
H.M.
L.P. COALESCER
PIPELINE
C.M.
STORAGE

FIGURE E 2 SEPARATION

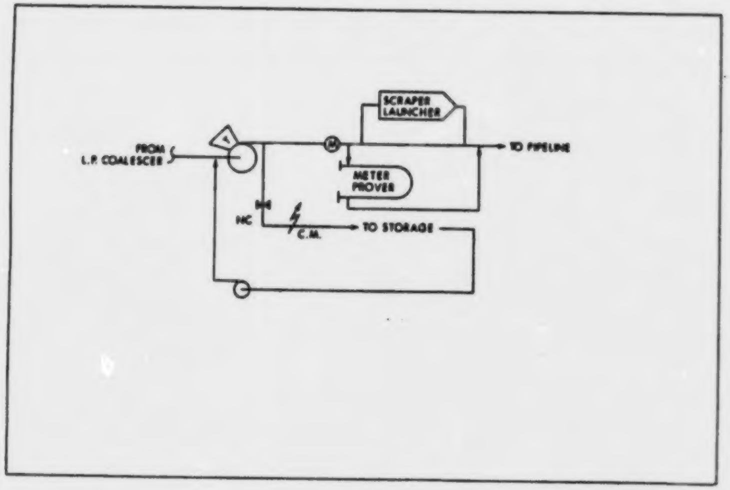

FROM L.P. COALESCER
SCRAPER LAUNCHER
M
METER PROVER
TO PIPELINE
HC
C.M.
TO STORAGE

FIGURE E 3 CRUDE OIL SYSTEM

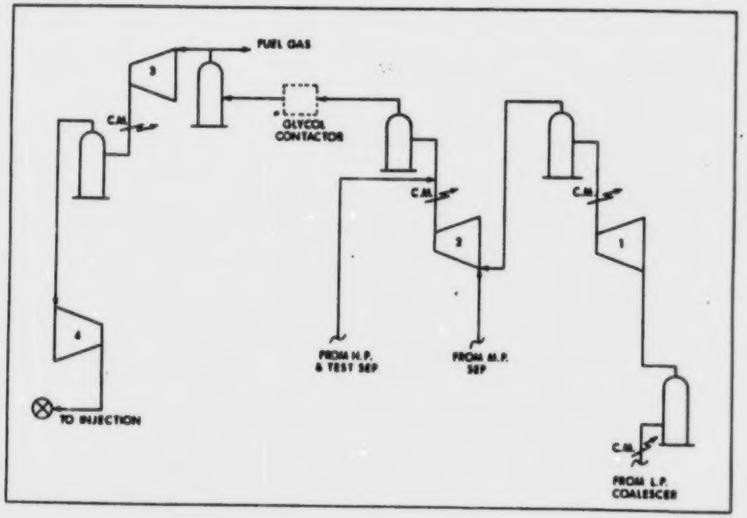

FUEL GAS
3
C.M.
GLYCOL CONTACTOR
C.M.
2
C.M.
1
4
TO INJECTION
FROM H.P. & TEST SEP
FROM M.P. SEP
C.M.
FROM L.P. COALESCER

FIGURE E 4 COMPRESSION SYSTEM

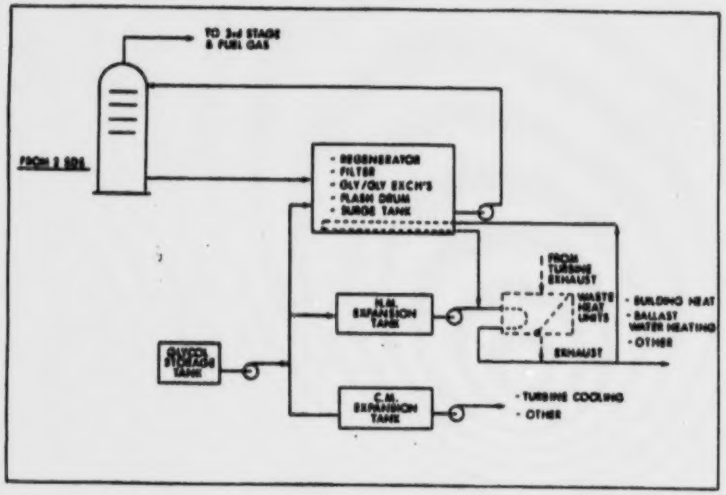

TO 3rd STAGE
& FUEL GAS
FROM 2 SDS.
- REGENERATOR
- FILTER
- GLY/GLY EXCH'S
- FLASH DRUM
- SURGE TANK
FROM TURBINE EXHAUST
WASTE HEAT UNITS
- BUILDING HEAT
- BALLAST WATER HEATING
- OTHER
H.M. EXPANSION TANK
EXHAUST
GLYCOL STORAGE TANK
C.M. EXPANSION TANK
- TURBINE COOLING
- OTHER

FIGURE E 5 GLYCOL SYSTEM

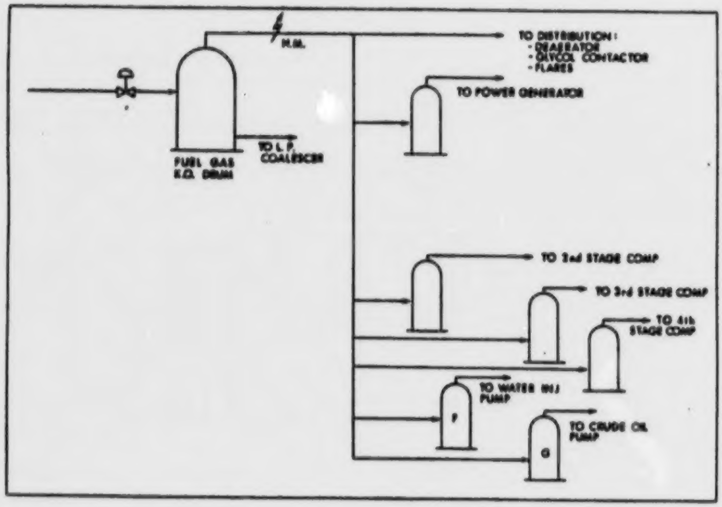

H.M.
TO DISTRIBUTION :
- DEAERATOR
- GLYCOL CONTACTOR
- FLARES
TO POWER GENERATOR
FUEL GAS K.O. DRUM
TO L.P. COALESCER
TO 2nd STAGE COMP
TO 3rd STAGE COMP
TO 4th STAGE COMP
TO WATER INJ PUMP
F
TO CRUDE OIL PUMP
G

FIGURE E 6 FUEL GAS SYSTEM

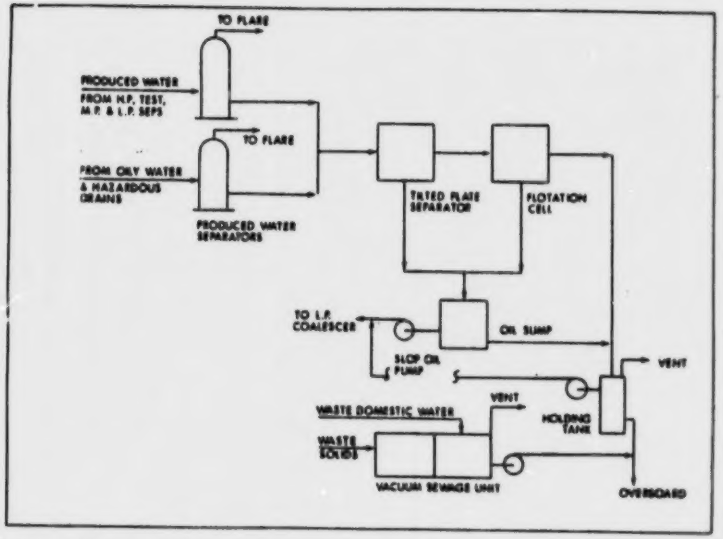

TO FLARE
PRODUCED WATER
FROM H.P. TEST, M.P. & L.P. SEPS
TO FLARE
FROM OILY WATER & HAZARDOUS DRAINS
PRODUCED WATER SEPARATORS
TILTED PLATE SEPARATOR
FLOTATION CELL
TO L.P. COALESCER
SLOP OIL PUMP
OIL SUMP
VENT
HOLDING TANK
WASTE DOMESTIC WATER
VENT
WASTE SOLIDS
VACUUM SEWAGE UNIT
OVERBOARD

FIGURE E 7 WASTE WATER SYSTEM

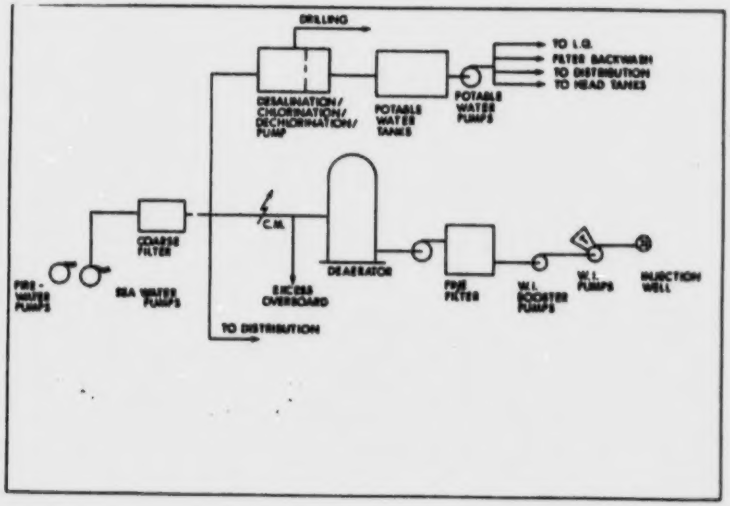

DRILLING
DESALINATION/ CHLORINATION/ DECHLORINATION/ PUMP
POTABLE WATER TANKS
POTABLE WATER PUMPS
TO I.G.
FILTER BACKWASH
TO DISTRIBUTION
TO HEAD TANKS
COARSE FILTER
C.M.
DEAERATOR
FINE FILTER
W.I. BOOSTER PUMPS
W.I. PUMPS
INJECTION WELL
FIRE - WATER PUMPS
SEA WATER PUMPS
EXCESS OVERBOARD
TO DISTRIBUTION

FIGURE E 8 SEA WATER SYSTEM : INJECTION/UTILITY/FIRE

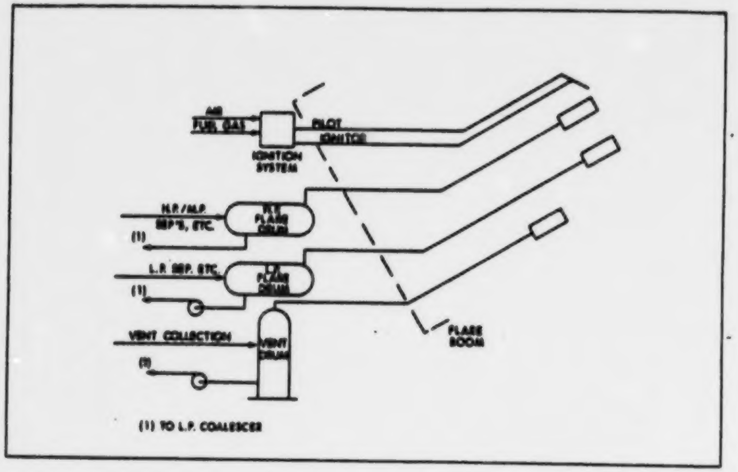

AIR
FUEL GAS
PILOT
IGNITOR
IGNITION SYSTEM
H.P./M.P. SEP'S, ETC.
H.P. FLARE DRUM
(1)
L.P. SEP. ETC.
L.P. FLARE DRUM
(1)
VENT COLLECTION
VENT DRUM
(1)
FLARE BOOM
(1) TO L.P. COALESCER

FIGURE E 9 FLARE AND VENT SYSTEM

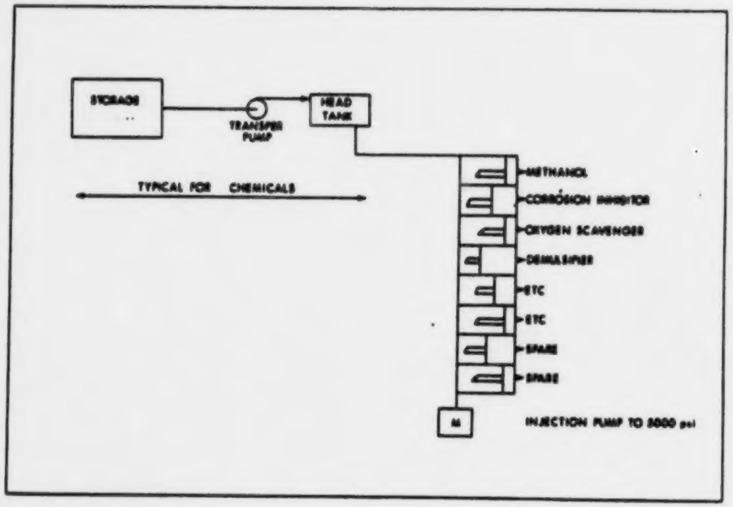

STORAGE
TRANSFER PUMP
HEAD TANK
TYPICAL FOR CHEMICALS
METHANOL
CORROSION INHIBITOR
OXYGEN SCAVENGER
DEMULSIFIER
ETC
ETC
SPARE
SPARE
M
INJECTION PUMP TO 5000 psi

FIGURE E 10 CHEMICAL INJECTION

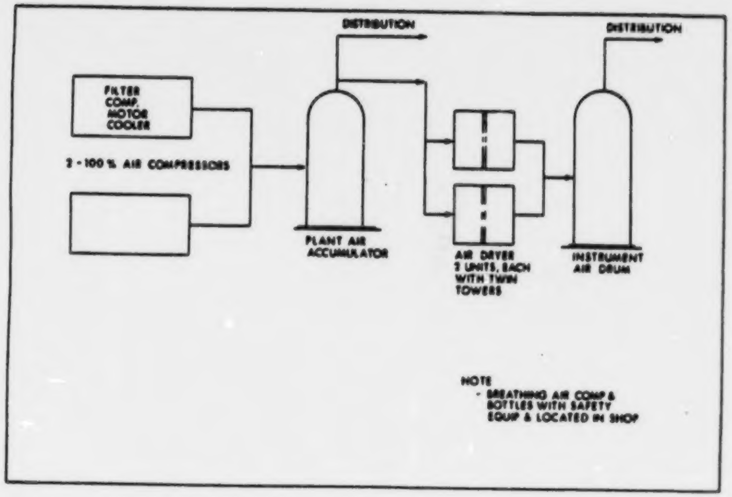
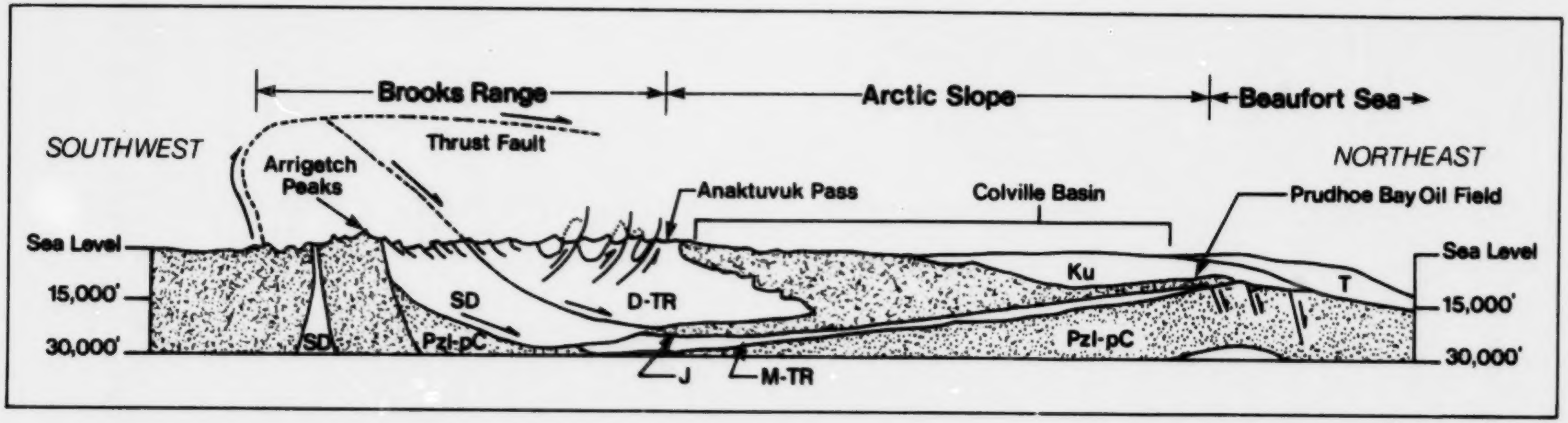

FILTER
COMP.
MOTOR
COOLER
2 - 100 % AIR COMPRESSORS
DISTRIBUTION
PLANT AIR ACCUMULATOR
AIR DRYER 2 UNITS, EACH WITH TWIN TOWERS
DISTRIBUTION
INSTRUMENT AIR DRUM
NOTE
- BREATHING AIR COMP & BOTTLES WITH SAFETY EQUIP & LOCATED IN SHOP

FIGURE E 11 AIR SYSTEM

APPENDIX 'F'

GEOLOGICAL AND CRUDE OIL ASSAY DATA


Brooks Range
Arctic Slope
Beaufort Sea
SOUTHWEST
NORTHEAST
Thrust Fault
Arrigetch Peaks
Anaktuvuk Pass
Colville Basin
Prudhoe Bay Oil Field
Sea Level
15,000'
30,000'
SD
D-TR
Ku
T
Pzl-pC
J
M-TR

North Slope Geology - Generalized Cross Section From The Brooks Range To The Beaufort Sea

ALASKA CRUDE OIL ASSAYS (1)

	SADLEROCHIT	KUPARUK	WEST SAK[2]
CRUDE			
Gravity, °API	26.4	23.0	22.4
Sulfur wt %	1.06	1.76	1.82
Pour pt, °F.	0	-55	-50
Rvp, psi	3.55	2.6	2.70
Kin. vis. @60° F.	42.42	cSt: 79.98	95.92
H2S, lb/1,000 bbl	0.35	<5	--
Salt, lb/1,000 bbl	32.7	--	--
Carbon residue, wt %	4.40	7.37	7.62
Neut. no. (D974)	1.12	--	0.68
Ni/V, ppm	11/26	19/57	22/61
Nitrogen, ppm	2090	1980	--
C4 & lighter, yield, vol %	1.17	--	0.63
C5 & lighter, yield, vol %	--	2.12	--
LIGHT GASOLINE			
Range, °F	C5-150	(TPB), C5-150	C5-150
Yield, vol %	2.2	1.6	1.9
Sulfur, wt %	<0.001	0.006	0.004
RON clear	71.5	--	--
MON clear	69.8	--	--
RON + 0.5g TEL/gal	78.4	--	--
NAPHTHA			
Range. °F.	150-380	150-380	150-380
Yield, vol %	15.6	14.5	14.4
Sulfur, wt %	0.013	0.018	0.018
Paraffins, vol %	39.7	38.3	36.4
Napthenes, vol %	43.3	47.0	48.2
Aromatics, vol %	17.0	14.7	15.4
DISTILLATE			
Range, °F.	380-650	380-650	380-650
Yield, vol %	28.6	26.9	27.5
Gravity, °API	33.1	--	31.6
Sulfur, wt %	0.414	0.66	.700
Pour pt, °F	-25	-25	-35
Cetane No.	45.8	45.4	42.1
Total N2, ppm	79	--	--
Vis. cSt @ 100° F.	--	3.083	3.34
Aromatics, vol %	33.6	30.0	31.4
BLENDED GAS OIL		GAS OIL	GAS OIL
Range, °F.	650-840	650-840	650-840
Yield, vol %	16.4	18.9	16.6
Gravity, °API	23.8	20.5	21.1
Sulfur, wt %	1.10	1.79	1.81
Aniline pt, °C	74.7	104.3	--
Pour pt, °F	70	50	60
Kin. Vis. @100° F.	--	34.20	43.99
Carbon residue, %	0.012	wt %: .01	--
Total nitrogen, ppm	950	600	840
Basic nitrogen	0.03	wt %: .02	0.023
V/Ni, ppm	--	<1	
RESIDUE			
Range, °F.	650+	650+	650+
Yield, vol %	52.4	56.0	55.6
Gravity, °API	15.0	11.7	10.8
Sulfur, wt %	1.63	2.59	2.53
Carbon residue, %	8.82	wt %: 12.61	wt %: 13.15
Total nitrogen, ppm	3600	--	--
Pour pt, °F.	80	40	45
Kin. vis. @ 210 °F.	47.54	97.15	135.3
Kin. vis. @ 275 °F.	15.55	--	--
Pentane insoluble, wt %	--	--	14.97

[1] Aalund, L.R., "Guide to Export Crudes for the '80s," Oil and Gas Journal, Dec. 19, 1983.

[2] Crude not in production, but pilot program is underway in Kuparuk area to determine feasibility. Assay sample obtained during drill stem test.

S/D Tables: CRUDE, rev 11/22/84

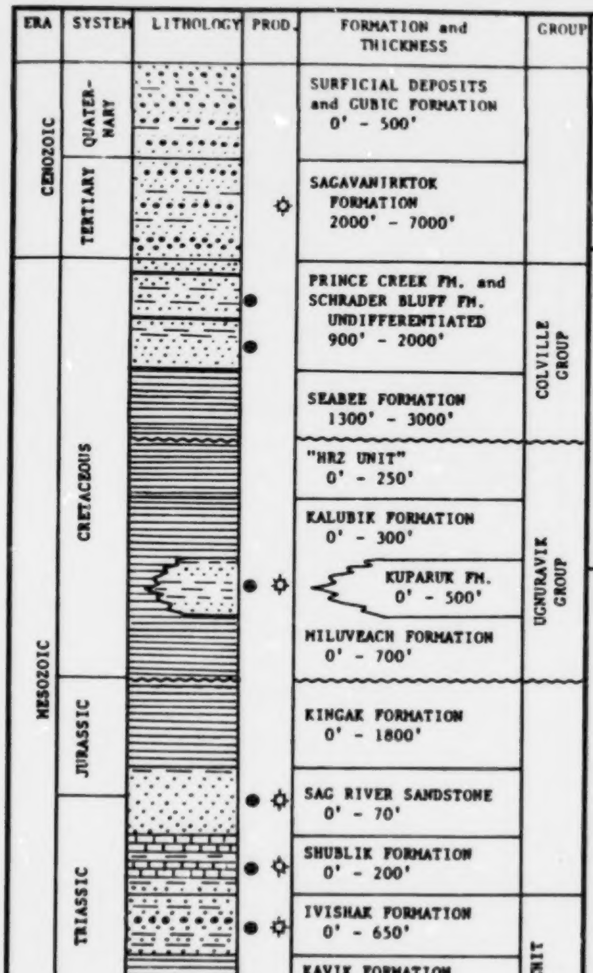
ALASKA OIL AND GAS CONSERVATION COMMISSION

GENERALIZED STRATIGRAPHIC COLUMN

KUPARUK FIELD AND PRUDHOE BAY FIELD AREA

NORTH SLOPE, ALASKA

MARCH, 1984



ERA	SYSTEM	PROD.	FORMATION and THICKNESS	GROUP
CENOZOIC	QUATERNARY		SURFICIAL DEPOSITS and CUBIC FORMATION 0' - 500'	
	TERTIARY	☼	SAGAVANIRKTOK FORMATION 2000' - 7000'	
MESOZOIC	CRETACEOUS	● ●	PRINCE CREEK FM. and SCHRADER BLUFF FM. UNDIFFERENTIATED 900' - 2000'	COLVILLE GROUP
			SEABEE FORMATION 1300' - 3000'	
			"HRZ UNIT" 0' - 250'	UGNURAVIK GROUP
			KALUBIK FORMATION 0' - 300'	
		● ☼	KUPARUK FM. 0' - 500'	
			MILUVEACH FORMATION 0' - 700'	
	JURASSIC		KINGAK FORMATION 0' - 1800'	
	TRIASSIC	● ☼	SAG RIVER SANDSTONE 0' - 70'	
		● ☼	SHUBLIK FORMATION 0' - 200'	
		● ☼	IVISHAK FORMATION 0' - 650'	SADLEROCHIT GROUP
			KAVIK FORMATION 0' - 200'	
PALEOZOIC	PERMIAN		ECHOOKA FORMATION 0' - 150'	
	PENNSYLVANIAN	● ☼	WAHOO LIMESTONE and ALAPAH LIMESTONE UNDIFFERENTIATED 350' - 2600'	LISBURNE GROUP
	MISSISSIPPIAN		ITKILYARIAK FORMATION 200' - 850'	ENDICOTT GROUP
		● ☼	KEKIKTUK FORMATION 200' - 750'	
PRE-CAMBRIAN	PRE-MISSISSIPPIAN		ARGILLITE and METASEDIMENTS	

LEGEND

▤	MUDSTONE OR SHALE	▦	LIMESTONE
▤	SILTSTONE	▦	DOLOMITE
░	SANDSTONE OR SAND	▭	COAL
▩	CONGLOMERATE OR GRAVEL	▨	ARGILLITE & METASEDIMENTS

● OIL PRODUCTION OR TEST INTERVAL

☼ GAS PRODUCTION OR TEST INTERVAL

REMARKS

1) Geologic interpretation of subsurface stratigraphic relationships changes as new data are developed. To the extent possible, the interpretation shown is consistent with the references cited.

2) No vertical scale in either time or thickness is intended.

3) The Prince Creek Fm. & Schrader Bluff Fm. Undifferentiated contain the "Ugnu sands" and the "West Sak sands" that have produced oil on well tests.

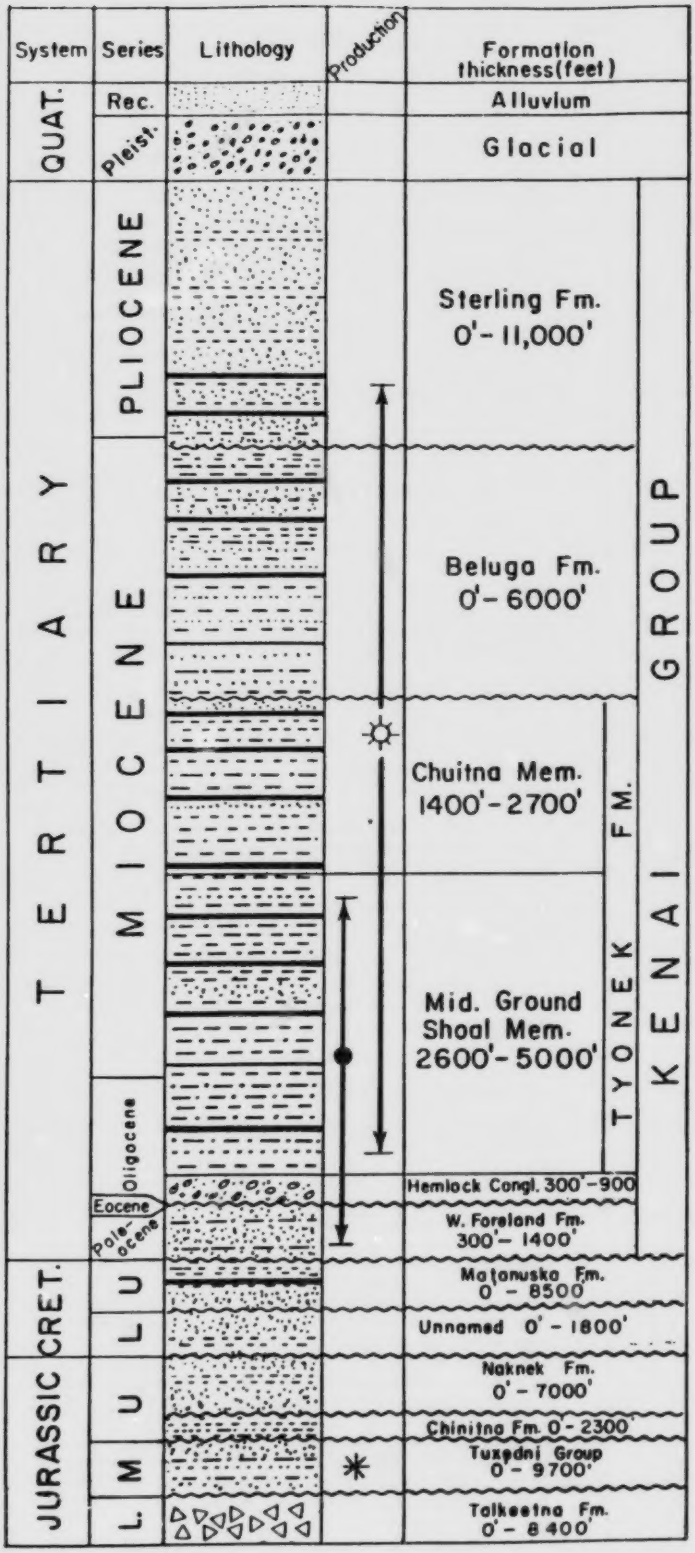
4) The Put River Sandstone in the eastern part of Prudhoe Bay Field is correlative with the Kuparuk Fm. (Carman & Hardwick, p. 1022).

5) In the western area the Itkilyariak Fm. and the Kekiktuk Fm. are not differentiated (see Bird & Jordan, p. 1498).

6) To the southeast the Kayak Fm. interfingers with and is correlative with parts of the Itkilyariak Fm. and the Kekiktuk Fm. (see Bird & Jordan, p. 1500).

REFERENCES

1) Carman, G. J., & P. Hardwick, 1983, Geology & Regional Setting of Kuparuk Oil Field, Aalska, A.A.P.G. Bulletin, v. 67, n. 6, pp. 1014-1031.
2) Bird, K. J., 1982, Rock-unit Reports of 228 Wells Drilled on the North Slope, Alaska, U.S.G.S. Open File Report 82-278, 106 p.
3) Alaska Geological Society, 1981, West to East Stratigraphic Correlation Section, N.P.R.A.--Prudhoe Bay, Arctic Slope Alaska.
4) Jamison, H. C., L. D. Brockett, & R. A. McIntosh, 1980, Prudhoe Bay--A 10 Year Perspective, A.A.P.G. Memoir 30, pp 289-314.
5) Reiser, H. N., D. K. Norris, J. T. Dutro, Jr., & W. P. Brosgee, 1978, Restriction and Renaming of the Neruokpuk Formation, Northeastern Alaska, U.S.G.S. Bulletin 1457-A, pp. A106-A107.
6) Bird, K. J., & C. F. Jordan, 1977, Lisburne Group (Mississippian and Pennsylvanian), Potential Major Hydrocarbon Objective of Arctic North Slope, Alaska, A.A.P.G. Bulletin., v. 61, n. 9, pp. 1493-1515.


System
Series
Lithology
Production
Formation thickness(feet)
QUAT.
Rec.
Alluvium
Pleist.
Glacial
TERTIARY
PLIOCENE
Sterling Fm.
0'-11,000'
MIOCENE
Beluga Fm.
0'-6000'
Chuitna Mem.
1400'-2700'
Mid. Ground Shoal Mem.
2600'-5000'
TYONEK FM.
KENAI GROUP
Oligocene
Hemlock Congl. 300'-900'
Eocene
Paleocene
W. Foreland Fm.
300'-1400'
CRET.
U
Matanuska Fm.
0'-8500'
L
Unnamed 0'-1800'
JURASSIC
U
Naknek Fm.
0'-7000'
Chinitna Fm. 0'-2300'
M
Tuxedni Group
0'-9700'
L
Talkeetna Fm.
0'-8400'

LEGEND

- ▨ Conglomerate
- ▨ Sandstone
- ▨ Siltstone
- ▨ Mudstone/Shale
- ▭ Coal
- ▨ Volcanics
- ● Oil production interval
- ☼ Gas production interval
- ✳ Surface oil seeps

REFERENCES

Alaska Geological Society, 1970, oil and gas fields in the Cook Inlet Basin, Alaska.

Calderwood, K.W. and Fackler, W.C., 1972, Proposed stratigraphic nomenclature for Kenai Group, Cook Inlet Basin, Alaska. Am. Assoc. Petroleum Geologists Bull., v.56 no.4, p. 739-754

Magoon, L.B., and Claypool, G.E., 1979, Petroleum Geology of Cook Inlet Basin, Alaska -- an exploration model: U.S.G.S. open file report no. 79-548.

Detterman, R.L., and Reed, B.L., 1980, Stratigraphy, Structure, and Economic Geology of the Illiamna Quadrangle, Alaska: U.S.G.S. Bull. 1368-B.

Fisher, M.A., and Magoon, L.B., 1978, Geologic Framework of Lower Cook Inlet, Alaska, A.A.P.G. Bull., Vol. 62 No. 3, p. 373-402.

ALASKA OIL AND GAS
CONSERVATION COMMISSION
GENERALIZED
STRATIGRAPHIC COLUMN

Cook Inlet Basin, Alaska

April, 1981

APPENDIX 'G'

ALASKA TELEPHONE UTILITY - OIL INDUSTRY DIRECTORY YELLOW PAGES (extract)

Oil Field Supplies

OIL FIELD SUPPLIES & SERVICES GUIDE

A list of various oil field supplies and services and firms who sell them follows this heading

Alaska Hydraulics Inc
5001 Arctic Blvd 562-2217
Alaska Valve And Fitting Co
6130 Tuttle Pl 563-5630
Alpine Electric Inc 530 W 72nd .. 349-4681
Arctic Technology Inc
750 E Fireweed Ln 276-7110
CAMERON IRON WORKS
1310 International Airport Rd ... 562-2332

CONTINENTAL SERVICES INC

Feeding • Housing
Consulting
Complete Catering
& Housekeeping
Services for the Oil & Gas Industry
Construction & Geophysical Survey Camps
Government Agencies • Bonded

"FOR SERVICE"

SALES & SERVICE

STATEWIDE

Continental Services Inc
700 E 46th Av 563-3616

Corrosion Control Supply Co
4831 Old Seward Hwy 561-2402
Denali Sales Company
3605 Arctic Blvd 562-2167
Dowland-Bach Corp
PO Bx 4-1321 Anchorage AK 99509
6130 Tuttle Pl 562-5818

The city of Anchorage itself was the by-product of an early-day federal construction program.

Drilling Supply & Rental Inc
5400 Lake Otis Pkwy 563-3800
FMC CORPORATION
Wellhead Equipment Division
O-C-T Wellhead Equipment
700 W International Airport Rd . 563-3990
Garness Industrial Inc
Waste Water & Water
Treatment Equipment & Service
6317 Nielson Wy 562-2933

GLOBAL SERVICES INC

- PORT CAMPS ANY SIZE
- CATERING & HOUSEKEEPING
- EXPEDITING
- CONSULTING SERVICES
- EQUIPMENT PROCUREMENT

SERVING ALL OF ALASKA

701 W 58th Av 562-3082

Gray Tool Co
6605 Arctic Spur Rd 562-2055
IMCO Services A Halliburton Company
4454 Business Park Blvd 562-2255
JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406
Lawson Products Inc
5801 Bristol Dr 345-6443

MAGCOBAR DRILLING FLUID SYSTEMS—

SALES & SERVICE

MAGCOBAR NORTH AMERICA DIVISION
OF DRESSER INDUSTRIES
721 W 1st Av 274-5564

NATIONAL SUPPLY CO DIV ARMCO STEEL CORP 5610 Old Seward Hwy ... 562-2833
PRUDHOE BAY SUPPLY
411 E 54th Av 563-3207
Quadco 611 Raspberry Rd 349-2530

STEEL FABRICATORS

SEE OUR AD UNDER

STEEL DISTRIBUTORS

"FOR INFORMATION CALL"

PLANT & OFFICE

ANCHORAGE

Steel Fabricators
2132 Railroad Av 276-4303

The Anchorage area is the hub of the state's construction industry.

OIL FIELD SUPPLIES & SERVICES GUIDE

As an added convenience to the users of this directory, the businesses shown below have listed their names by their type of products or services.

Belts & Belting

ALASKA RUBBER & SUPPLY
5811 Old Seward Hwy 562-2200
JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406

Buildings Portable

DOWNS & YOUNG PIPE & STEEL
6626 Greenwood 344-2818
PETROFAB INTERNATIONAL
4636 E Marginal Way S
Seattle WA 206 762-6464
Or Call Anchorage 274-7414
Steel Fabricators
2132 Railroad Av 276-4303

Camp Design

Bechtel Alaska Inc
1801 W 48th Av 243-5255

Camp Management Contractors

OCEANIC BUTLER INC 3300 C 561-5176

Camps

OCEANIC BUTLER INC 3300 C 561-5176
PRODUCTION SERVICES INC
4113 Ingra 562-2910
UNIVERSAL SERVICES INC-INTERNATIONAL
4791 Business Park Blvd 561-1200

Casing

N L ATLAS BRADFORD
6300 Petersburg 563-3819

Caterers

BECHTEL ALASKA INC

- COMPLETE CATERING SERVICE
- COMPLETE HOUSEKEEPING SERVICE

1801 W 48th Av 243-5255

FRONTIER CATERING INC

CATERING HOUSEKEEPING & CAMP RENTALS

- OIL FIELD
- CONSTRUCTION
- REMOTE SITE

Suite 230 Anchorage
4450 Cordova 561-3607

GLOBAL SERVICES INC

- PORT CAMPS ANY SIZE
- CATERING & HOUSEKEEPING
- EXPEDITING
- CONSULTING SVCS
- EQUIPMENT PROCUREMENT

SERVING ALL OF ALASKA

701 W 58th Av 562-3082

Anchorage boasts 78 miles of signed and paved bike paths.

INTERNATIONAL SUPERIOR SERVICES INC

CAMP CATERING
SUPPORT SERVICES
AND MAINTENANCE

5401 Cordova 563-3025

OCEANIC BUTLER INC

"It Takes Calories To Produce Energy"

OVER 17 YEARS EXPERIENCE IN WORLDWIDE CATERING, HOUSEKEEPING & MAINTENANCE

CAMPS AND INDUSTRIAL CATERING FOR

OILFIELD, CONSTRUCTION
MINING - GEOPHYSICAL
MARINE, OFFSHORE

3300 C 561-5176

PRODUCTION SERVICES INC

AN ALASKA FOOD SERVICE MANAGEMENT COMPANY SPECIALIZING IN

- Employee Cafeterias
- Oil Rigs & Base Camps
- Construction Camps
- Complete Portable Survey & Geophysical Camps
- Project Consulting
- Portable Building Rentals
- Serving Alaska Since 1969

4113 Ingra 562-2910

UNIVERSAL SERVICES INC-INTERNATIONAL
4791 Business Park Blvd 561-1200

Cleaning

ALASKA CHEMEX ARMC SERVICES

- OIL RIGS & SUPPORT EQUIPMENT
- TOTAL WASH SYSTEMS
- MOBILE & STATIONARY

Anchorage 349-4696

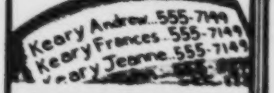
Communications

ALASKA TELCOM INC
See Our Ad At Radiotelephone Communications
1105C 277-6325

(CONTINUED NEXT PAGE)

Anchorage is bordered to the north, south and west by the waters of Cook Inlet and to the East by the Chugach Mountains.

Put your family in our who's who.

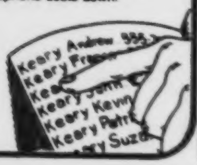


Give everybody in the family their own listing in the directory

Call the phone company today

Using the directory won't cost you a dime.

Every time you call Directory Assistance these days it can add to your telephone expense. You can help cut these expenses and get the number you need very simply. Just use the directory yourself. Remember, the directory is one do-it-yourself kit that'll definitely keep telephone costs down.



OIL FIELD SUPPLIES & SERVICES GUIDE

As an added convenience to the users of this directory, the businesses shown below have listed their names by their type of products or services.

Oil Field Supplies & Services Guide—(Cont'd)

Construction Equipment

ARCTIC SLOPE WRIGHT SCHUCHART CONSTR CO

WE LEASE
ALL TYPES OF
CONSTRUCTION
EQUIPMENT

6700 Arctic Spur Rd 349-4430

FRONTIER EQUIPMENT COMPANY
550 W 7th Av 279-1471
WEAR-WELL TRACTOR PARTS
4966 NE 122nd
Portland OR 503 286-0106

Consultants

Alaska National Saftey Services
7001 Jewel Lk Rd 248-2642
HYDRAULICS UNLIMITED INC
Hydraulic System Design
To Your Specification
341 E 77th Av 349-7611
LMB ENTERPRISES
3521 View Pt Cir 243-8841

Contractors General

ARCTIC SLOPE WRIGHT SCHUCHART CONSTR CO

PIPELINE
CONTRACTORS

6700 Arctic Spur Rd 349-4430

HIGHLANDER OILFIELD SYSTEM SVC INC
13400 Highland Dr 344-1577

Controls & Regulators

ARCTIC TECHNOLOGY INC
750 E Fireweed Ln 276-7110
DOWLAND-BACH CORP
PO Box 4-1321 Anchorage AK 99509
6130 Tuttle Pl 562-5818

Corrosion Control

CORROSION CONTROL SUPPLY CO
4831 Old Seward Hwy 561-3402

Couplings

ACE SUPPLY INC 2425 E 5th Av .. 277-4113
ALASKA RUBBER & SUPPLY
5811 Old Seward Hwy 562-2200
JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406

Divers

UNDERWATER CONSTRUCTION INC
8740 Hartzell Rd 349-7580

Drafting Service

McMAHON'S TECHNICAL DRAFTING SERVICE
See Our Ad Under Drafting Services
Anchorage 346-0343

Directory Advertising Pays!

Drilling Bits

EXPLORATION SUPPLY & EQUIP INC
6727 Seward Hwy 344-2589
NORTON-CHRISTENSEN DRILLING PRODUCTS
Down Hole Tools
6324 Nielson Wy 563-3369
Smith Tool-Division Of Smith International
3211 Denali 274-5527

Drilling And Boring Contractors

EXPLORATION SUPPLY & EQUIP INC
6727 Seward Hwy 344-2589

Drilling Supplies, Miscellaneous

TRI-FLO INDUSTRIES OF ALASKA
6300 Petersburg 563-3535

Electric Motor Generator Repair

WESTINGHOUSE ELECTRIC CORP
568 E Whitney Rd 274-3523

Electric Motors Dealers & Repair

Garness Industrial Inc
6317 Nielson Wy 562-2933

Electrical Engineers

WESTINGHOUSE ELECTRIC CORP
568 E Whitney Rd 274-3523

Excavating

FRONTIER ROCK & SAND INC
550 W 7th Av 274-8873
PIONEER OIL FIELD SERVICES INC
550 W 7th Av 279-1471

Filters

ACE SUPPLY INC 2425 E 5th Av .. 277-4113
HYDRAULICS UNLIMITED INC
Hydraulic & Pneumatic Filters
341 E 77th Av 349-7611
NORTHERN HYDRAULICS LTD
4510 Stuart Wy 562-2656

Fittings Hose

ACE SUPPLY INC 2425 E 5th Av .. 277-4113
ALASKA RUBBER & SUPPLY
5811 Old Seward Hwy 562-2200

Fittings-Valves

ALASKA VALVE AND FITTING CO

Complete Line of Precision
WHITEY & NUPRO VALVES
In Stock
Box 4-1286 Anchorage 99509

6130 Tuttle Pl 563-5630

OTECS
Sealweld Corp Ltd Products
"Distributor"
3306 E 16th Av 277-2918

Fluid Level Testing

Fluid Level Services Inc
Anchorage 272-8134
Wasilla Shop 376-6143

Gaskets

Steam Supply & Rubber
Huffman Business Park 345-3728

Gauges Instruments Etc

ALASKA INSTRUMENT CO INC
Taylor Instrument Co Representative
210 Center 561-2211
ARCTIC TECHNOLOGY INC
750 E Fireweed Ln 276-7110
HYDRAULICS UNLIMITED INC
341 E 77th Av 349-7611
MARTIN DECKER CO
611 Raspberry Rd 349-2530
OTECS

DISTRIBUTOR FOR
HYDRALINE GAUGES & INSTRUMENTS
THE GAUGE COMPANY FOR THE
OIL INDUSTRY
Ask About Our Conditional Warranty
Against Loss Of Calibration

3306 E 16th Av 277-2918

STEAM SUPPLY & RUBBER
Huffman Business Park 345-3728

Generators-Diesel

Industry Services Inc 4113 Ingra 562-2621

Geological Services

Hepco Services 330 L 277-8101

Hoses

ACE SUPPLY INC 2425 E 5th Av .. 277-4113
ALASKA RUBBER & SUPPLY
5811 Old Seward Hwy 562-2200
HYDRAULICS UNLIMITED INC
341 E 77th Av 349-7611
JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406
NORTHERN HYDRAULICS LTD
4510 Stuart Wy 562-2656
Steam Supply & Rubber
Huffman Business Park 345-3728

House Keeping

BOATEL ALASKA INC
1801 W 48th Av 243-5256
Q-1 Service
Maintenance Consultant
Custodial & Security Training
1230 W Int Arpt Rd 562-4468

Hydraulic Equipment

ALASKA HYDRAULICS INC
5801 Arctic Blvd 562-2217
HYDRAULICS UNLIMITED INC
341 E 77th Av 349-7611
JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406
NORTHERN HYDRAULICS LTD

COMPLETE HYDRAULIC
SYSTEMS & DESIGN
See Our Ad Under Hydraulic
Equipment & Supplies
24 Hr Ans Service

4510 Stuart Wy 562-2656

Steam Supply & Rubber
Huffman Business Park 345-3728

Advertise Here—It Pays

Incinerators

Garness Industrial Inc
6317 Nielson Wy 562-2933
Steel Fabricators
2132 Railroad Av 276-4303

Instrumentation Systems

SIMPSON ELECTRICAL & INSTRUMENTATION SPECIALISTS
Control And Instrument
Repair For Oil Industry
Commercial Industrial And
Remodeling
7430 Margaret Cr 344-7879
Steam Supply & Rubber
Huffman Business Park 345-3728
Water Systems Of Alaska
130 W Int Arpt Rd 562-4243

Logging

ANALYSTS THE 702 W 32nd Av .. 562-3000
EXPLORATION LOGGING USA INC
5430 Fairbanks 563-3112
NL BAROID-NL INDUSTRIES INC
4617 Business Park Blvd 561-1871
TELECO OILFIELD SERV OF ALASKA INC

TELECO

MEASUREMENT WHILE
DRILLING
DIRECTIONAL SURVEYING
MWD LOGGING

Anchorage
6116 Nielson Way 562-2646

Lubricants

JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406
OTECS
Sealweld Corp Ltd Products
"Sales & Service"
3306 E 16th Av 277-2918
PETROLEUM DISTRIBUTING COMPANY

ARCO, CONOCO &
MOBIL LUBES
SPECIALTY PRODUCTS
TESORO DRUMMED FUELS

1320 Port Rd 279-0214
Marketing Dept
3380 C 561-5521

Machine Shops

ENGINE & GEAR CO INC

- GENERAL MACHINE WORK
- HARD CHROME PLATING & GRINDING
- INDUSTRIAL ENGINE SPECIALISTS

2130 E Dimond Blvd 349-2982

EXPLORATION SUPPLY & EQUIP INC
6727 Seward Hwy 344-2589

(CONTINUED NEXT PAGE)

The Classified Tells Who Sells

OIL FIELD SUPPLIES & SERVICES GUIDE

As an added convenience to the users of this directory, the businesses shown below have listed their names by their type of products or services.

Oil Field Supplies & Services Guide—(Cont'd)

SUPERIOR MACHINE & WELDING

- Portable Equipment
- Oil Field Specialists
- Metalizing
- Marine Prop Repair
- Pump Repairing
- Fabrication

SERVING ALASKA SINCE 1950

1745 Ship Av 277-3538

[illegible] MACHINE & WELDING
3839 Old Seward Hwy 563-3012

WESTINGHOUSE ELECTRIC CORP
360 E Whitney Rd 274-3823

Marine Services

ALASKA OFFSHORE INC

Gulf Of Alaska To Beaufort Sea

CONTRACT CHARTERS

CREW BOATS
SUPPLY BOATS
RESEARCH BOATS
GULF OF ALASKA
TO BEAFORT SEA

1327 E 75th Av 349-4578

NORTHERN OFFSHORE INC

MARINE DEVELOPEMENT
MANAGEMENT &
PLANNING

8740 Hartzell Rd 349-5822

Meters & Valves

ACE SUPPLY INC 2425 E 5th Av . . 277-4113

ANDERSON INC
Safety Valves
1577 C 277-4747

Mud

DRESSER INDUSTRIES
721 W 1st Av 274-5544

NL BAROID-NL INDUSTRIES INC
4617 Business Park Blvd 561-1871

Oil Field Trailers

TAMSCO Anchorage 349-6481

Anchorage, the fastest growing metropolitan area in the U.S., has a population of over 200,000.

Pile Driving Contractors

ARCTIC SLOPE WRIGHT SCHUCHART CONSTR CO

GENERAL
CONTRACTORS

6700 Arctic Spur Rd 349-4430

[illegible] CONSTRUCTION & RIGGING
901 W 1st Av 338-7688

UNDERWATER CONSTRUCTION INC
8740 Hartzell Rd 349-7588

Pile Driving Equipment

NORTHERN HYDRAULICS LTD
4510 Stuart Wy 562-2686

Pipe

TAMSCO Anchorage 349-6481

Pipe Fittings

ALASKA VALVE AND FITTING CO

Complete Line Of Precision
CAJON
Pipe Fittings In Stock
Box 4-1288 Anchorage 99509

6130 Tuttle Pl 563-5630

Pipe Industrial

ALASKA PIPE & SUPPLY INC
2300 E 63rd Av 561-4411

PRESCOTT EQUIPMENT CO
467 W Chesterfield Dr 276-6537

ROCKFORD CORP Anchorage 344-4881

Pipe Line Contractors

ARCTIC SLOPE WRIGHT SCHUCHART CONSTR CO

VSM
AND
PILE DRIVING
SPECIALISTS

6700 Arctic Spur Rd 349-4430

ROCKFORD CORP Anchorage 344-4881

Downtown Anchorage is an unusual mixture of old and new -big city and casual town: large enough to provide the finest in accommodations and services, still small enough to stroll through.

Pumps

ACE SUPPLY INC 2425 E 5th Av . . 277-4113

ALCO PUMP SALES

- SLURRY PUMPS
- CORNELL
- ENPO-CROWN
- JABSCO INDUSTRIAL
- AMPCO

WE SPECIALIZE IN
SPEED OF DELIVERY

"IF IT'S WET WE CAN MOVE IT"

Anchorage 248-2740

DOWLAND-BACH CORP

- THERMOCOUPLE EXTENSION
- INSTRUMENT WIRE
- REPRESENTING DEKORON / EATON

6130 Tuttle Pl 562-5818

EXPLORATION SUPPLY & EQUIP INC
6727 Seward Hwy 344-2589

Garness Industrial Inc
6317 Nielson Wy 562-2933

HYDRAULICS UNLIMITED INC
341 E 77th Av 349-7611

WATER SYSTEMS OF ALASKA
130 W Int Arpt Rd 562-4243

Pumps-Repairing

HYDRAULICS UNLIMITED INC
341 E 77th Av 349-7611

Rigging

JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406

Rotary Hose

ALASKA RUBBER & SUPPLY
5811 Old Seward Hwy 562-2200

JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406

Rotary Joints

Steam Supply & Rubber
Huffman Business Park 345-3720

Rubber Products

ALASKA RUBBER & SUPPLY
5811 Old Seward Hwy 562-2200

JACKOVICH TRACTOR & EQUIPMENT CO
1716 Post Rd 277-1406

Safety Services

ALASKA NATIONAL SAFTEY SERVICES
7801 Jewel Lk Rd 248-3642

Security Services

AMERICAN GUARD & ALERT INC
1413 Hyder 272-8804

Alaska's State Bird is the Ptarmigan

Sewage Systems

Garness Industrial Inc
6317 Nielson Wy 562-2933

Steel Fabricators
2132 Railroad Av 276-4303

Snow Melters

Steel Fabricators
2132 Railroad Av 276-4303

Steam Traps & Strainers

Steam Supply & Rubber
Huffman Business Park 345-3720

Steel Fabrication

DOWNS & YOUNG PIPE & STEEL
6626 Greenwood 344-2818

Surveyors & Steering

TELECO OILFIELD SERV OF ALASKA INC

TELECO

MEASUREMENT WHILE
DRILLING
DIRECTIONAL SURVEYING
MWD LOGGING

Anchorage
6116 Nielson Way 562-2646

Tank Leasing

TAMSCO Anchorage 349-6481

TAMSCO FABRICATING & LEASING INC
3300 C 561-2002

Tanks

DOWNS & YOUNG PIPE & STEEL
6626 Greenwood 344-2818

Faulkner Supply & Services
1431 K 277-4838

Garness Industrial Inc
6317 Nielson Wy 562-2933

Steel Fabricators
2132 Railroad Av 276-4303

TAMSCO Anchorage 349-6481

WESTERN STATES ASSOC INC
633 E 81st Av 344-7322

Tools-Renting

SERVCO CO
Division Of SII
6131 A 561-1012

Track Vehicles

TRACK VEHICLES OF ALASKA INC
See Ad All-Terrain Vehicles
1200 E 76th Av 344-7117

Trucking-Heavy Hauling

HUSTLERS INC
7810 Old Seward Hwy 349-2577

Tubing

DOWLAND-BACH CORP
PO Box 4-1321 Anchorage AK 99509
6130 Tuttle Pl 562-5818

(CONTINUED NEXT PAGE)

OIL FIELD SUPPLIES & SERVICES GUIDE

As an added convenience to the users of this directory, the businesses shown below have listed their names by their type of products or services.

Valves

ALASKA INSTRUMENT CO INC
S 11 Willis-Oil Tools Representative
210 Center 561-2211
ALASKA PIPE & SUPPLY INC
2300 E 63rd Av 561-4411

ALASKA VALVE AND FITTING CO

Complete Line Of Dependable
SWAGELOK
Tube Fittings In Stock
Box 4-1288 Anchorage 99509
6130 Tuttle Pl 563-5630

ARCTIC TECHNOLOGY INC
750 E Fireweed Ln 276-7110
HYDRAULICS UNLIMITED INC
341 E 77th Av 349-7611
NORTHERN HYDRAULICS LTD
4510 Stuart Wy 562-2886
STEAM SUPPLY & RUBBER
Hoffman Business Park 349-3720

Water Purification & Filtration Equipment

Garness Industrial Inc
6317 Rhetson Wy 562-2933
WATER SYSTEMS OF ALASKA
130 W Int Arpt Rd 562-4243

Water Systems-Potable

Garness Industrial Inc
6317 Rhetson Wy 562-2933
Steel Fabricators
2132 Railroad Av 276-4303

Weather Advisories

NORTHERN DRILLING SVCS
3216 Thomas Av 243-6309

Welding

BIG 3 LINCOLN ALASKA INC
6415 Arctic Blvd 562-2000
DOWNS & YOUNG PIPE & STEEL
6626 Greenwood 344-2018
Steel Fabricators
2132 Railroad Av 276-4303

One of Anchorage's major assets is its position as the hub of a well organized and still expanding sea-surface-air transportation network.

TESTING INSTITUTE OF ALASKA

Off Post
Road At
[illegible]

WELDING
Non-Destructive
Inspection
Specialists • Alaska
Licensed Welding
Inspectors

TESTING
X & Gamma Ray
Ultrasonic
Mag Practice
Eddy Current
Liquid Penetrant
Consulting/Specs

WELDING
Training
Certifications
Procedure
Qualifications
Metallurgical Studies

N D T & WELDING INSPECTION
SUPPLIES
2114 Railroad Av 276-3440

[illegible] CORPORATION

MATTING BOARDS
OIL FIELD WELDING & FABRICATION
WALKING BOARDS
TUNGSTEN CARBIDE &
HARD METAL PLACEMENT
FOR JUNKMILLS/CASTING CUTTERS
BITS/STABILIZERS/AUGERS
750 E International Airport Rd . 562-2509

WESTINGHOUSE ELECTRIC CORP
560 E Whitney Rd 274-3622

Welding Equipment & Supplies

BIG 3 LINCOLN ALASKA INC
6415 Arctic Blvd 562-2000

Wellhead Equipment

AXELSON INC
Safety Valves
1577 C 277-4747
TAPECO Anchorage 349-6481

Winches & Hoists

NORTHERN HYDRAULICS LTD
Braden Hydraulic Winches
4510 Stuart Wy 562-2886

Back in territorial days, Alaska was plagued by its isolation and lack of efficient transportation. But in more modern times an efficient transportation system has been developing with Anchorage as its central city.

Wire

DOWLAND-BACH CORP

HASKEL AIR-DRIVEN
PUMPS
P O Box 4-1321 Anchorage AK 99509
6130 Tuttle Pl 562-5818

X-Ray Inspection Services

TESTING INSTITUTE OF ALASKA

Off Post
Road At
[illegible]

X-RAY
Non-Destructive
Inspection
Specialists • Alaska
Licensed Welding
Inspectors

TESTING
X-Gamma
Ultrasonic
Mag Practice
Eddy Current
Liquid Penetrant
Consulting/Specs

WELDING
Training
Certifications
Procedure
Qualifications
Metallurgical Studies

N D T & Welding
Inspection Supplies
2114 Railroad Av 276-3440

TAPECO—
WELL HEAD SERVICES
225 W 92nd Av 349-4662

Anchorage is strategically located midway between the Matanuska-Susitna Valleys and the Kenai Peninsula

---

Alaska Dall Sheep meat is delicious if not stored too long in a freezer. After one to two months, the tallow should be trimmed as close as possible since it tends to absorb odor and cause an unpleasant taste. Cook Dall Sheep in the same manner as you would cook beef.

Oil & Gas Exploration & Development

ARCO EXPLORATION CO 700G 276-1215
Alaska Exploration Corporation
2536 Arlington Dr Anchorage 277-7887
Alaska Map Service
430 W 7th Av 272-3275
ALASKAN CRUDE CORP
500 W 7th Av 338-6363
Amerada Hess Corp
550 W 7th Av 274-4512
B P Alaska Exploration Inc
550 W 7th Av 338-7200
CGG American Services Inc
5630 Silverado Wy 561-1900
Cities Service Oil Co
1016 W 6th Av 272-9441
Conoco Inc 3201 C 564-7600
Enserch Exploration Inc
1227 W 9th Av 276-1922
Geophysical Corp Of Alaska
225 Cordova 279-1486
Geophysical Service Inc
5801 Silverado Wy 563-3070
Gulf Oil Corp 301 Danner Av 349-4522
Husky Oil NPR Operations Inc
5333 Fairbanks 562-2831
Kelly Thomas E Earth Sciences Consultants
225 Cordova 276-6262

UNIPAC EXPLORATION CO INC

MILE-HI EXPLORATION CO INC
PACIFIC WEST EXPLORATION CO
SUITE 604
1200 E 76th Av 344-1568

Stewart Petroleum Company
550 W 7th Av 277-2481
Texas Eastern Exploration Co
Anchorage 272-4512

VESTRA ENERGY

- EXPLORATION
- DEVELOPMENT
- MINING
- VENTURE CAPITAL

VO

JOINT VENTURES AVAILABLE

VESTRA ENERGY
12650 SW 1st
Beaverton OR 503 646-9945

WESTERN GEOPHYSICAL CO OF AMERICA
351 E Int Arpt Rd 563-3811
Marine Division
5630 B 563-3415
Western Lands & Leasing Corp
3540 Wingate Cir 277-1587

Oil Land Leases

Commonwealth Energy Inc
921 W 6th Av 272-4455
Lovely Lum Consulting Geologist
4131 Seward Hwy 561-4361
Vallee William O 430 W 7th Av .. 272-2753

Oil Producers

ARCO ALASKA INC
Main Office
700G 276-1215
ARCO OIL & GAS CO 700G 276-1215
Amoco Production Co
Office
425G 272-8471
Or 279-7651
Butler Aviation-Anchorage Inc
Administration
4965 Int Arpt Rd 243-4322
Operations
4565 W Int Arpt Rd 248-5000
City Dock Terminal
1331 Tidewater Rd 277-4624
Emtor Corporation 510L 276-8600
EXXON CO USA 3301 C 561-5331
Hunt Energy Corp
Suite 1100
550 W 7th Av 276-4868

(CONTINUED NEXT PAGE)

HAVE A NICE DAY

Oil Producers—(Cont'd)

Marathon Oil Co
  District Office
    3201 C 561-5311
  Beaver Creek
    4021 E Int Arpt Rd 563-0759
Phillips Petroleum
  Oil & Gas Exploration
    5150 279-1581
Phillips Petroleum 550 W 7th Av 276-7886
Placid Oil Co
  Suite 1100
  Oil & Gas Dept
    500 W 7th Av 276-4868
Shell Western E&P Inc
  Production & Exploration
    Alaska Mutual Savings Building
      Anchorage 276-2545
      Platform "A" 279-5941
      Platform "C" 279-6033
      On Shore Facility 279-0352
      Kenai Production Office 283-3096
      Platform C
      279-6033
SOHIO ALASKA PETROLEUM COMPANY
  900 E Benson Blvd 561-5111
    Prudhoe Bay Unit Plan Subcommittee
    279-9561
  Employment Information 279-9124
  Flight Operations
    4510 W Int Arpt Rd 243-1556
  Warehouse
    1310 W 54th Av 563-3975
TENNECO OIL 3201 C 561-3488
Texaco Inc
  Area Marketing Office
    1601 Tidewater Rd 279-1526
  Producing Dept
    550 W 7th Av 276-9611

Oil Refiners

Oil Reclamation Co Of Alaska Inc
  4789 Business Pk Blvd 562-1010

Oil Reports

PETROLEUM INFORMATION CORP
  3200 C 561-8422

Oil Spill Clean-Up

Alaska Clean Seas
  Ofc
    12350 Industry Wy 349-6491

ALASKA OFFSHORE INC

ALASKA OFFSHORE, INC.

- Oil Spill Cleanup Specialists
- Consulting, Training & Sales
- Oil Sorbent Materials
- Vessel Charters
- Environmental & Marine Service

24 HOUR EMERGENCY RESPONSE
STATEWIDE SERVICE

ALASKA OFFSHORE INC
  1327 E 75th Av 349-4870

ALASKA POLLUTION CONTROL

EXPERIENCED OIL SPILL
CLEAN UP
WASTE OIL & SORBENTS

10620 Old Seward Hwy 344-5036

CASEY [illegible] & ASSOCIATES
  Chevron Preventive Liners
  825 W 6th Av 279-8008

[illegible] ENVIRONMENTAL SERVICES CORPORATION

24 HR OIL SPILL CLEAN-UP
CONSULTING - SALES - TRAINING

Anchorage 344-1511

Oil Spill Clean-Up —(Cont'd)

Environmental Clean-Up Inc
  529 W 3rd Av 276-1689
JACKOVICH TRACTOR & EQUIPMENT CO
  3M & SPC Absorbents
  1716 Post Rd 277-1406
VERN'S ASPHALT MAINTENANCE
  Anchorage 349-7222

Oil Well Cementing

Dowell Schlumberger Inc
  Anchorage Regional Office
    4665 Business Park Blvd 561-1324

Oil Well Directional Drilling

ANALYSTS THE 702 W 32nd Av 562-3600
BROWN HAROLD CO DIRECTIONAL DRILLING
  8115 Lloyd Dr 243-2322
CONTROLLED DRILLING CONSULTANTS
  3901 Steller 333-1882
EASTMAN WHIPSTOCK INC
  5849 Old Seward Hwy 563-3650
GREAT LAND DIRECTIONAL DRILLING INC
  1111 E 80th Av 349-4511

Oil Well Drilling

ALASKA UNITED DRILLING INC
  5141 Fairbanks 561-1268
BRINKERHOFF SIGNAL INC
  1211 E 80th Av 344-2988
Conservative Drilling Co
  1111 E 80th Av 344-5527
Doyon Drilling Co J V 420 L 276-2631
DRILLING MUD HAULERS INC
  7010 Old Seward Hwy 349-7884
Global Marine Drilling Co 3601 C 562-1001
Karea Drilling Company Ltd
  921 W 6th Av 279-8633
N K G DRILLING & CONSULTANTS INC
  550 W 7th Av 279-9686
  (See Advertisement This Classification)
NABORS ALASKA DRILLING INC
  Bus Ofc
    4300 B 561-4460
  Personnel Dept 561-4480
PARKER DRILLING CO
  10560 Old Seward Hwy 349-1881

POOL ARCTIC ALASKA

Specialty contract drilling geared for adverse Arctic weather and tough logistic conditions.
Our people and rigs will "get the job done right." If we don't have what you want, we'll get it - or we'll build it.

POOL ARCTIC ALASKA
  300 C 276-5454

Roll's Alaska Inc 3300 C 561-7458
Rowan Drilling US 601 W 5th Av 279-2448
Western Oceanic Inc
  921 W 6th Av 272-8561

Oil Well Drilling Mud & Additives

Baroid
  See NL Baroid-NL Industries Inc
Dresser Industries
  Guiberson Division Of Dresser Industries
    721 W 1st Av 274-5564
MAGCOBAR DRILLING FLUID SYSTEMS—

SALES & SERVICE

MAGCOBAR NORTH AMERICA DIVISION OF DRESSER INDUSTRIES
  721 W 1st Av 274-5564

MILCHEM INC
  Building D Suite 10
  4790 Business Pk Blvd 561-1951
  Evenings 345-6442
NL BAROID-NL INDUSTRIES INC
  4617 Business Park Blvd 561-1871
  If No Answer Call Kenneth W Butler
  345-5641
  John G Rose 243-8813

Anchorage's boundaries encompass 2,000 square miles.

Oil Well Equipment & Supplies

ACE SUPPLY INC
  See Our Ad Petroleum Equipment
  2425 E 5th Av 277-4112
ALASKA CONTROLS INC
  4216 Spenard Rd 243-2618
Alaska Petroleum Services Inc
  1705 Ship Av 277-1254

ALASKA TENT & TARP INC

PIT LINERS - RITE HERCULITE
DRILL RIG COVERS
PORTABLE BERMS
FIBRETEX GEOTEXTILES
MANUFACTURING & REPAIRS

Unit No 3
5400 A 562-2293

AXELSON INC 1577 C 277-4747
CAMCO INC 6041 MacKay 562-2132
  Telecopier 563-8283
Cameron Iron Works
  1310 International Airport Rd 562-2332
DAYCO RUBBER PRODUCTS—

SALES & SERVICE

QUADCO
  611 Raspberry Rd 349-2538

Drilco Division Of Smith International Inc
  4111 Ingra 562-2676
  Br 562-2360
DRILLING SUPPLY & RENTAL INC
  5406 Lake Otis Pkwy 563-2080
FMC Corporation
  Wellhead Equipment Division O-C-T
    700 W International Airport Rd
    563-3990
Franklin Supply Co
  6621 Arctic Spur Rd 563-3573
[illegible] Industrial Inc
  Utility Equipment Rentals
  6317 Nielson Wy 562-2933
Hughes Offshore
  3917 Carleton Av 248-0230
Hughes Tool Co
  1310 W International Airport Rd
  561-4000

JWH Co 4801 Fuller 563-1050
JACKOVICH TRACTOR & EQUIPMENT CO
  1716 Post Rd 277-1406
MARTIN DECKER INSTRUMENTS—

SALES & SERVICE

QUADCO
  611 Raspberry Rd 349-2538

McEvoy Div Of Smith International Inc
  3221 Denali 279-5461
N L ATLAS BRADFORD
  6300 Petersburg 563-3810
NL BAROID-NL INDUSTRIES INC
  4617 Business Park Blvd 561-1871
  If No Answer Call Kenneth W Butler
  345-5641
  John G Rose 243-8813
National Supply Co Div Armco Steel Corp
  5610 Old Seward Hwy 562-2033
Oilwell Div Of United States Steel Corp
  5713 Arctic Blvd 563-3136
OLYMPIC PREFABRICATORS INC
  1577 C 338-6171
Quadco 611 Raspberry Rd 349-2538
REED ROCK BIT CO—

AUTHORIZED DISTRIBUTORS

TORQUE TURN SPECIALISTS
..... 345-4214

Reynolds Equip Co Inc
  1537 E 5th Av 272-8493
SII WILLIS-OIL TOOLS—

REPRESENTATIVES

ALASKA INSTRUMENT CO INC
  210 Center 561-2211

SERVCO CO
  Division Of SII
  6131 A 561-1012

(CONTINUED NEXT PAGE)

In 1942 the Alaska Highway was built: first overland connection to the Lower 48.

N K G DRILLING & CONSULTANTS

OIL FIELD CONSTRUCTION

279-9686

550 W 7th SUITE 1600 ANCH 99501

Oil Well Equipment & Supplies—(Cont'd)

SMITH TOOL-DIVISION OF SMITH INTERNATIONAL

SMITH TOOL

Smith Tool-Division Of Smith International 3211 Denali . 274-5527

uperior Tank & Construction Co
2347 Loussac Dr 248-3232
upply Line Inc
300 W Int Arpt Rd 561-7301
ET TEXSTEAM—
SALES & SERVICE
QUADCO
611 Raspberry Rd 349-2530

AMSCO Anchorage 349-6481
ASCO INTERNATIONAL INC—
SALES & SERVICE
QUADCO
611 Raspberry Rd 349-2530

etco Offshore Inc Anchorage 276-8044
WEATHERFORD ALASKA INC

POWER TONG SERVICE · HANDLING TOOLS
CASING CREWS
GATOR HAWK PRESSURE TESTING
SPINNER HAWK SALES & RENTALS
CEMENTING TOOLS
STRIP-O-MATIC RENTALS
PO Box 2389 Anchorage AK 99509
6620 Arctic Spur Rd 561-1632

VECO EQUIPMENT INC
2020 E 3rd Av 277-1841

Oil Well Equipment & Supplies-Renting

ATWOOD INC 3727 Seward Hy ... 562-2160
DRILLING SUPPLY & RENTAL INC
5400 Lake Otis Pkwy 563-2800
LAND & MARINE RENTAL CO
Kenai Rd Kenai 776-8140
SNAPCO INDUSTRIES INC
Mi 1/2 Spur Rd Soldotna 262-4000

The Department of Commerce says the U.S. has the cheapest, most efficient phone system anywhere.

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Vann
Engineered Well Completions
innovators of VANNSYSTEM®
Tubing Conveyed ™ Perforating
338-7168
880 H ANCHORAGE

Oil Well Fishing Tools

Tri-State Oil Tool Industries Inc
1317 W Northern Lights Blvd 279-6511
TRI-STATE OIL TOOLS & SERVICE

FISHING · CUTTING ·
MILLING · AND
RENTAL TOOLS
24-HOUR SERVICE

Tri-State

"FOR SERVICE CALL"

Tri-State Oil Tool Industries Inc
A Baker International Company
1317 W Northern Lights Blvd
.... 279-6511
If No Answer Call Kenai 776-8791

Oil Well Logging & Perforating

Baker Sand Control
4497 Business Pk Blvd 563-0825
CAMCO INC 6041 MacKay 562-2132
Telecopier 563-8283
Dresser Atlas Dresser Industries Inc
Area Ofc
3600 B 563-3233
North Slope District
5839 Old Seward Hwy 563-3669
Gearhart Industries Inc
139 E 51st Av 562-2530
Or Call 279-5312
GEO VANN 880 H 338-7168
(See Advertisement This Classification)
Schlumberger Offshore Services
Alaska Division Operations
500 W Int Arpt Rd 562-2654

Oil Well Services

AMERICAN-CANADIAN STRATIGRAPHIC CO
4540 Business Park Blvd 561-1884
American Coldset Corp
6137 MacKay 563-3624
Or 561-1935
ANALYSTS THE
702 W 32nd Av 562-2000
BJ-HUGHES INC
8141 Briarwood 349-6518
Kenai 776-8182
Prudhoe Bay 659-2678
BAKER PACKERS
Baker Service Tools
4497 Business Pk Blvd 561-1920
BAKER SAND CONTROL

BAKER SAND CONTROL
BAKER
PERFORATING SYSTEMS
FILTRATION SERVICES INC
4497 Business Pk Blvd 563-0825

CAMCO INC
Oilwell Services
6041 MacKay 562-2132
Telecopier 563-8283
CORE LABORATORIES INC
8005 Schoon 349-3541
DOWELL SCHLUMBERGER INC
4665 Business Park Blvd 561-1234
EXPLORATION LOGGING USA INC
Suite 11
3430 Fairbanks 563-3112
Fairweather Inc
6601 S Air Pk Pl 248-5307
FLOPETROL-JOHNSTON-SCHLUMBERGER CO
1111 E 80th Av 349-9520
Kenai Alaska 283-7118
Prudhoe Bay 659-2519
FLUID LEVEL SERVICES INC
Anchorage 272-0136
Wasilla Shop 376-6143
G B R EQUIP INC

- G B R CASING SERVICE
- EXXON OILS & LUBES
- THREAD COMPOUNDS
- REGAL RUBBER PRODUCTS

6300 Petersburg 563-3000

Oil Well Services—(Cont'd)

GEARHART INDUSTRIES INC
Wireline Division
139 E 51st Av 562-2530
M W D Division
5333 Fairbanks 563-1922
HALLIBURTON SERVICES
Seward Hwy 562-2100
Kenai Ofc 283-4982
HYDRO-TEST OF ALASKA
35270 Kenai Spur Hwy Soldotna . 262-5021
LYNES INC 12100 Industry Wy ... 345-4046
NL Baroid-NL Industries Inc
6617 Business Park Blvd 561-1071
Or 243-8813
N L Sperry-Sun Inc
5650 Old Seward Hwy 563-3430
NL Baroid-NL Industries Inc
Or 274-2583
NORALCO INTERNATIONAL CORPORATION
Oil & Gas Well Testing
6617 Arctic Blvd 561-1888
NORTHERN DRILLING SVCS

SITE WEATHER
EXPEDITING • RADIO
P/U LEASING &
SMALL BOATS
GENERAL LABOR
3216 Iliamna Av 243-6309

NORTON-CHRISTENSEN DRILLING PRODUCTS
6324 Nielson Wy 563-3250
Norton-Christensen MWD
6324 Nielson Wy 563-4232
OEECO UK Inc 880 H 338-6113
Otis Engineering Corp
5630 Silverado Wy 562-2254
SCHLUMBERGER OFFSHORE SERVICES
Alaska Division Operations
500 W Int Arpt Rd 562-2684
Kenai 776-8155
Prudhoe-Open Hole
Or 659-2279
Prudhoe Bay Production Services
Or 659-2487
Computing Center 561-1921
SNAPCO INDUSTRIES INC
Mi 1/2 Spur Rd Soldotna 262-4000
SUPERIOR MACHINE & WELDING
See Our Ad Under Machine Shops
1745 Ship Av 277-3838
Tasco
Anchorage 349-6481
TELECO OILFIELD SERV OF ALASKA INC
6116 Nielson Way 562-2646
TEST-O-LITE SPHERES 1577 C ... 277-1128
Tri-Flo Industries Of Alaska
6300 Petersburg 563-3635
WEATHERFORD ALASKA INC

POWER TONG SERVICE HANDLING TOOLS
CASING CREWS
GATOR HAWK PRESSURE TESTING
SPINNER HAWK SALES & RENTALS
CEMENTING TOOLS
STRIP-O-MATIC RENTALS
PO Box 2389 Anchorage AK 99509
6620 Arctic Spur Rd 561-1632

WELL HEAD SERVICES
225 W 92nd Av 349-4668
Westley Inc Anchorage 344-0958
WHITE C A WIRE LINE SERVICE
Soldotna 262-4496

Oil Well Surveyors

ANALYSTS THE 702 W 32nd Av .. 562-2000
BROWN HAROLD CO DIRECTIONAL DRILLING
8115 Lloyd Dr 243-2322
EASTMAN WHIPSTOCK INC
5849 Old Seward Hwy 563-3600
TELECO OILFIELD SERV OF ALASKA INC
6116 Nielson Way 562-2646

Oils-Diesel

DAY & NIGHT FUEL CO
See Our Ad At Oils-Fuel
6401 Lake Otis Pkwy 344-6868

Russia has only one telephone for every 20 people and most of the telephones are in large cities.

LOCATE

PROTECT THE COMMUNITY FROM HAZARDS AND DISRUPTED SERVICE

BEFORE DIGGING CALL

Anchorage Telephone Utility 564-1555
Anchorage Water & Wastewater Utility 786-5557
Buffer Aviation Pipeline 243-4322
Chugach Electric Assoc Inc 563-2270
Enstar Natural Gas Company 264-3740
Matanuska Electric Assoc Inc
Big Lake 892-6021
Chugiak & Eagle River 694-2161
Palmer & Vicinity 745-3231
Matanuska Telephone Assoc Inc
Chugiak & Eagle River 694-3121
Palmer & Vicinity 745-3121
Military Petroleum Fuel Lines 862-4112
Multivisions 562-3133
Municipal Light & Power 279-7671
State Storm Drains 337-9481
State Street Lights 337-9481
Tesoro 561-5089
Traffic Signal Cable 786-8355

Oils-Fuel

CHEVRON PRODUCTS—
BULK PRODUCTS
CHEVRON U S A INC
Ocean Dock Rd 786-6678
Dispatch 265-6707

CONSOLIDATED FUEL

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CHEVRON HEATING OILS
24-Hour Delivery Service
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Metered Delivery
Complete Burner Service
1525 E 5th Av 279-2561

DAY & NIGHT FUEL CO

"KEEP THE HOME
FIRES BURNING"
24-HOUR SERVICE
Member Of Oil Heat Institute
Certified Meter Delivery
6401 Lake Otis Pkwy 344-4565

DENALI FUEL CO 1525 E 5th Av . . 272-5441
(See Advertisement This Classification)

Petro Products Co Inc
6401 Lake Otis Pkwy 344-4571

PETROLEUM DISTRIBUTING COMPANY—
DISTRIBUTORS
PETROLEUM DISTRIBUTING COMPANY
1320 Port Rd 279-0214

Petroleum Distributing Company
1320 Port Rd 279-0214
Dr 561-5569

PYE-PER FUEL CO

HEATING OIL
Diesel • Gasoline
CERTIFIED METER DELIVERY
RESIDENTIAL/COMMERCIAL SITE
1726 Karluk 276-3943

(See Advertisement This Classification)

TESORO ALASKA PETROLEUM CO

TESORO

"WE'RE
ENERGIZING
ALASKA!"

"FOR SERVICE CALL"
GENERAL OFFICES
TESORO ALASKA PETROLEUM CO
3300C 561-8821

The history of Southcentral Alaska reflects the cultural heritage of the Tanaina and Chugach Eskimos, as well as the influence of later Russian occupation.

TESORO ALASKA PRODUCTS

TESORO

DRUMMED FUELS
FUEL OILS
DIESEL FUEL
GASOLINE

"FOR SERVICE CALL"
DISTRIBUTORS
PETRO PRODUCTS CO INC
6401 Lake Otis Pkwy 344-4571
If No Answer Call 344-4565

UNION HEATING OIL

GO WITH THE SPIRIT
THE SPIRIT OF 76

76

"FOR SERVICE CALL"
UNION OIL CO OF CALIFORNIA
1076 Ocean Dock Rd. 277-1474
HEATING OIL RESELLERS
KATMAI OIL & GAS INC
2900 Tudor Rd 561-1663

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VARGAS INC

BEST SERVICE
BEST PRICE
HEATING OIL DELIVERY
3300 Mountain View Dr 277-5533

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Denali
FUEL COMPANY

ALASKA MECHANICAL
MAINTENANCE

Serving The Anchorage
Area For 27 Years

Complete Burner
And Fuel Service

24 HOUR SERVICE

- HOME HEATING FUEL
- CONSTRUCTION SITE REFUELING
- KARD-LOCK & KEY LOCK FUEL

DENALI FUEL CO.

Phone 272-5441 1525 East 5th Ave., Anchorage, Alaska

TIRED
OF DIALING
THE SAME
NUMBER
OVER AND
OVER?

SPEED CALLING IS FOR YOU!
IT ALLOWS YOU TO DIAL A
7 OR 10 DIGIT TELEPHONE
NUMBER BY DIALING ONLY
ONE OR TWO DIGITS. EIGHT AND
THIRTY CAPACITY PROGRAMS
ARE AVAILABLE
CONTACT YOUR ATU SERVICE
REPRESENTATIVE

RESIDENTIAL 561-1221
BUSINESS 564-1000

Pye Per
Fuel Co.

HOME HEATING FUELS
CONSTRUCTION SITE DELIVERY
DIESEL FUEL

- HOME HEATING FUELS
- DIESEL FUEL
- CONSTRUCTION SITE REFUELING

CERTIFIED METER
DELIVERY

FOR SERVICE CALL
276-3943

1726 KARLUK ANCHORAGE, AK 99501

APPENDIX 'H'

ACTIVE EXPLORATION PLAN DRILLING REPORT AS OF APRIL 15, 1985

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                                                      ACTIVE EXPLORATION PLAN DRILLING REPORT AS OF  4/15/85

##################################################################################################################
OPERATOR                 SALE AREA                      LEASE NUMBERS                                  PWELL  END     EP APP  EXPLORA
                         PROSPECT
------------------------------------------------------------------------------------------------------------------
LEASE LATITUDE           XCOORD        UTM  RIGNAME & TYPE                APDSUB  SPUDDT  WTR DP  MD        CDPTH   STATUS OF WELL
BLOCK LONGITUDE          YCOORD        ZN.  API NUMBER                    APDAPP  COMPDT  WELL #  TVD               LAST CASING SET
##################################################################################################################


------------------------------------------------------------------------------------------------------------------
SOHIO ALASKA PET. CO.    #71, DIAPIR FIELD, BEAUFORT    0334, 0335, 0343, 0344                          2      TBA    062283  ONE WEL
                         MUKLUK                                                                                               PLANS F

0334  70 40' 59.26" N    576,800.0M     05  UNITED RIG # 2, MUKLUK GRAV IS  060283  110183  48 FT             TD      PERM PLUGGED AND ABANDONED
280   150 55' 10.24"W    7,843,200.0M       55-231-00001                    101783  012484  # 01
---------------------------------------------------------------------------------------------  ------------------------
EXXON COMPANY USA        #57, NORTON SOUND              0379, 0380, 0391, 0392, 0393, 0394, 0395, 03.  - 0397, 0398  16  TBA   122883  2 WELLS
                         NORTON SOUND                   0399, 0400, 0401, 0404, 0405, 0406, 0407, 0408, 0409, 0410                  PROPOSE
                                                        0411, 0413, 0414, 0415, 0416, 0418, 0419, 0420, 0421, 0422
                                                        0424, 0425, 0426, 0427, 0429, 0430, 0431, 0433, 0434, 0441
                                                        0442

0414  63 42' 42.8' N     513693.5M      03  ROWAN MIDDLETOWN JACKUP         032084  061984  54 FT             TD      PERM PLUGGED AND ABANDONED
267   164 43' 22.44"W    7,064,742.5M       55-344-00002                    060184  072384  # 01

0415  63 41' 52.15" N    515,997.8M     03  ROWAN MIDDLETOWN JACKUP         050384  P 84/7  50 FT   P 6000'
268   164 40' 35.08"W    7,063,171.2M       55-344-00004                                    # 01    P 6000'

0421  63 39' 51.4" N     522,779.9M     03  ROWAN MIDDLETOWN JACKUP         080884  P 84/8  40 FT   P 7000'
313   164 32' 23.21"W    7,059,475.3M       55-344-00007                                    # 01    P 7000'

0426  63 34' 51.02" N    537,591.9M     03  ROWAN MIDDLETOWN JACKUP         080884  P 85/8  40 FT   P 6500'
404   164 14' 33.94"W    7,050,318.1M       55-344-00006                                    # 01    P 6500'

0430  63 30' 40.34" N    537,835.1M     03  ROWAN MIDDLETOWN JACKUP         071884  072584  35 FT             TD      PERM PLUGGED AND ABANDONED
448   164 14' 22.99"W    7,042,561.3M       55-344-00005                    071984  081784  # 01

0434  63 29' 27.56" N    533,962.7M     03  ROWAN MIDDLETOWN JACKUP         050384  P 84/7  30 FT   P 6000'
492   164 19' 04.86"W    7,040,264.9M       55-344-00003                                    # 01    P 6000'

0425  P63 36' 05.62"N    P54,173.3 M    03  KEY HAWAII JACKUP               022185  P 6/85  40 FT   P 6600FT
361   P164 09'31.21"W    P7,052,679 M       55-344-00008                                    # 01    P 6600FT
------------------------------------------------------------------------------------------------------------------
ARCO ALASKA INC          #57, NORTON SOUND              0402, 0403, 0412, 0417, 0423, 0435, 0436, 0437, 0438, 0439  10  ????88  031984  1 WELL
                         BIRCH, EBONY PONDEROSA         0440

0436  64 04' 47.56"N     469,618.0M     03  KEY HAWAII JACKUP               040584  062584  65 FT             TD      PERM PLUGGED AND ABANDONED
949   165 37' 22.49"W    7,105,868.0M       55-375-00001                    060184  081984  # 01
------------------------------------------------------------------------------------------------------------------
SHELL WESTERN E & P INC. #70, ST. GEORGE BASIN          0443, 0445, 0446, 0448, 0449, 0450, 0451, 0453, 0454, 0456  24  TBA   051184  TWO WEL
                         FERN, PAINTBRUSH, AZALEA, MONK 0460, 0463, 0464, 0478, 0480, 0481, 0484, 0485, 0497, 0498                 YEAR R
                         SHOOD, CLOUDBERRY, ELDER, DUCK 0499

0454  55 33' 13.724"N    416,223.9M     03  OCEAN ODYSSEY SEMISUBMERSIBLE   052184  112084  420 FT            TD      PERM PLUGGED AND ABANDONED
467   166 19'40.016"W    6,157,057.5M       55-366-00004                    091484  012385  # 01

0463  55 26' 18.7494N    442,368.7M     03  OCEAN ODYSSEY SEMISUBMERSIBLE   010785  012685  394 FT            TD      PERM PLUGGED AND ABANDONED
604   165 54'39.1014W    6,143,743.9M       55-366-00007                    012185  032685  # 01

0485  P55 01' 26.18"N    P464,775.5 M   03  OCEAN ODYSSEY                   022685  P 3/85  379     P11000FT
      P165 33'03.41"W    P6,097,366 M       55-366-00009                    031485          # 01    P11000FT
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                                                                    ACTIVE EXPLORATION PLANS, NO DRILLING ACTIVITY, APDS SUBMITTED AS OF 4/15/85

****************************************************************************************************************************************************
OPERATOR                  SALE AREA                           LEASE NUMBERS                                                        PWELL  END     EP APP  EXPLOR
                          PROSPECT
----------------------------------------------------------------------------------------------------------------------------------------------------
LEASE LATITUDE          XCOORD        UTM   RIGNAME & TYPE                        APDSUB  SPUDDT  WTR DP  MD
BLOCK LONGITUDE         YCOORD        ZN.   API NUMBER                            APDAPP  C[illegible]T  WELL #  TVD
****************************************************************************************************************************************************


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PLACID OIL COMPANY        #70, ST. GEORGE BASIN               0461, 0465                                                           8      123185  050484  1ST WEL
                          UNNAMED                                                                                                                         15 DAYS

0461  55 26' 47.02" N   452,509.0M     03   PENROD 77 SEMISUBMERSIBLE             030684          399 FT  P 10000'
563   165 45' 02.7" W   6,144,509.0M        55-366-00003                                          # 01    P 10000'
----------------------------------------------------------------------------------------------------------------------------------------------------
EXXON COMPANY USA         #83, NAVARIN BASIN                  0564, 0565, 0566, 0567, 0568, 0569, 0570, 0572, 0573, 0574  39     TBA     122784  EACH WE
                          LEASE GROUPS I, II, III, IV, &      0576, 0581, 0582, 0583, 0584, 0585, 0589, 0590, 0591, 0592                          FIRST W
                          V                                   0593, 0599, 0600, 0601, 0602, 0604, 0606, 0607, 0611, 0613
                                                              0614, 0617, 0618, 0622, 0623, 0624, 0626, 0628, 0629, 0633
                                                              0636, 0640, 0645, 0657, 0658, 0659, 0685, 0686, 0687, 0688
                                                              0695, 0698, 0700, 0702, 0713, 0714, 0716, 0717, 0721, 0722

0599  P60 20' 35.37"N   P1,594,093FT   01   DOO SUNG SEMISUBMERSIBLE              032885  P 5/85  485 FT  P11100 '
693   P177 15'20.82"W   P21,946,972F        55-491-00002                                          # 01    P11100 '
----------------------------------------------------------------------------------------------------------------------------------------------------
ARCO ALASKA INC.          #83, NAVARIN BASIN                  0578, 0586, 0587, 0588, 0596, 0597, 0608, 0621, 0631, 0632  23     TBA     012385  APPROXI
                          PACKARD,ESSEX,MIDGET,LINCOLN,       0643, 0644, 0654, 0655, 0656, 0661, 0663, 0664, 0666, 0667                          FIRST W
                          EL DORADO,CROSLEY                   0689, 0690,

0586  P60 22' 26.5"N    P430,062 M     01   SEDCO 712 SEMISUBMERSIBLE             032685  P7/85   550 FT  P16000 '
637   P178 16' 5.58"W   P6,693,534 M        55-491-00001                                          # 01    P16000 '
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                                                  ACTIVE EXPLORATION PLAN DRILLING REPORT AS OF  4/15/85

*******************************************************************************************************************************
OPERATOR                 SALE AREA                            LEASE NUMBERS                                   PWELL  END     EP APP  EXPLOR/
                         PROSPECT
-------------------------------------------------------------------------------------------------------------------------------
LEASE LATITUDE           XCOORD         UTM  RIGNAME & TYPE                  APDSUB  SPUDDT  WTR DP  MD          CDPTH   STATUS OF WELL
BLOCK LONGITUDE          YCOORD         ZN.  API NUMBER                      APDAPP  COMPDT  WELL #  TVD                 LAST CASING SET
*******************************************************************************************************************************


0466  P55 35' 25.41"N  P359,823.5 M  03   OCEAN ODYSSEY                      022685  P 3/85  444 FT  P10000FT
411   P167 13'27.20"W  P6,162,511 M       55-366-00008                       031485          # 01    P10000FT
-------------------------------------------------------------------------------------------------------------------------------
ARCO ALASKA INC.         #70, ST. GEORGE BASIN           0457, 0490, 0493, 0494, 0500, 0505, 0509, 0511, 0516, 0531  13    090185  052584  TWO WEL
                         RAT, AMUKTA, ATTU, SEGULA       0536, 0537, 0538

0511  56 20' 41.821"N  356,045.0M     03   SEDCO 708 SEMISUBMERSIBLE         070384  110684  390 FT              TD      PERM PLUGGED AND ABANDONED
631   167 19'45.682"W  6,246,720.0M        55-367-00006                      080184  021085  # 01

0537  56 04' 46.77" N  328,598.4M     03   SEDCO 708 SEMISUBMERSIBLE         051584  080484  436 FT              TD      PERM PLUGGED AND ABANDONED
889   167 45' 15.13"W  6,218,151.2M        55-367-00003                      071384  103184  # 01
----------------------------------------------------------------------------------------------  ---  -------------------------
MOBIL OIL CORPORATION    #70, ST. GEORGE BASIN          0466                                                  3      TDA     052584  ONE WEL
                         BERTHA

0466  55 26' 23.91"N   499,709.1M     03   SEDCO 712 SEMISUBMERSIBLE         072184  092984  350 FT          FT  TD      PERM PLUGGED AND ABANDONED
616   165 0' 16.64"W   6,143,526.1M        55-366-00006                      082084  110184  # 01            FT
-------------------------------------------------------------------------------------------------------- - -------------------
GULF OIL COMPANY         #70, ST. GEORGE BASIN          0477, 0479, 0482                                      5      110188  051084  ONE WEL
                         CAMELOT

0477  55 10'20.369"N   375,897.0M     03   BIG DIPPER (DOO SUNG) SEMISUB     060684  112784  476 FT              TD      PERM PLUGGED AND ABANDONED
811   166 56'54.061"W  6,115,472.0M        55-366-00005                      080184  011885  # 01
-----------------------------------------------------------------------------------------------      -------------------------
CHEVRON USA INC          #70, ST. GEORGE BASIN          0513, 0519                                            11     013087  043084  ONE WEL
                         INTREPID                                                                                                    TEST.

0519  56 14' 24.80"N   332,862.0M     03   SEDCO 712 SEMISUBMERSIBLE         050484  072084  437 FT              TD      PERM PLUGGED AND ABANDONED
714   167 41'48.85"W   6,235,873.7M        55-367-00002                      062184  092584  # 01
-----------------------------------------------------------------------------------------------      -------------------------
EXXON COMPANY USA        #70, ST. GEORGE BASIN          0518, 0526, 0527, 0528, 0529, 0530                    18     TDA     042384  2 WELLS
                         TUSTUMENA

0518  56 14' 09.77"N   331,258.8M     03   BIG DIPPER (DOO SUNG) SEMISUB     062784  P 84/8  437 FT  P 12000'
713   167 43' 20.92"W  6,235,459.1M        55-367-00004                                      # 01    P 12000'

0518  56 16' 09.43" N  330,894.2M     03   BIG DIPPER (DOO SUNG) SEMISUB     062784  P84/10  435 FT  P 10400'
713   167 43' 50.6" W  6,239,177.4M        55-367-00006                                      # 02    P 10400'

0527  56 12' 27.95" N  364,256.9M     03   BIG DIPPER (DOO SUNG) SEMISUB     080084  091384  421 FT              TD      PERM PLUGGED AND ABANDONED
764   167 11' 18.13"W  6,231,144.6M        55-367-00007                      081784  111984  # 01

0530  56 09' 53.18"N   366,287.7M     03   BIG DIPPER (DOO SUNG) SEMISUB     041684  062984  420 FT              TD      PERM PLUGGED AND ABANDONED
809   167 09' 11.57"W  6,226,292.2M        55-367-00001                      062284  090484  # 01
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                                                  ACTIVE EXPLORATION PLAN DRILLING REPORT AS OF  4/15/85

****************************************************************************************************************
OPERATOR                  SALE AREA                    LEASE NUMBERS                               PWELL  END    EP APP  EXPLOR/
                          PROSPECT
----------------------------------------------------------------------------------------------------------------
LEASE LATITUDE         XCOORD         UTM   RIGNAME & TYPE                APDSUB  SPUDDT  WTR DP  MD        CDPTH    STATUS OF WELL
BLOCK LONGITUDE        YCOORD         ZN.   API NUMBER                    APDAPP  COMPDT  WELL #  TVD         .      LAST CASING SET
****************************************************************************************************************


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SHELL OIL COMPANY         #BF, BEAUFORT SEA            0175, 0179, 0180, 0181                      5      TBA    120181  1ST WEL
                          SEAL                                                                                           3RD WEL

0180  70 29' 31.773"N   436,908.0M      06    P.N.J.V. RIG#1 SEAL GRAV. IS.   111684  022285  39 FT.  P16500FT  8820 FT  DRILLING
472   148 41'34.68"W    7,821,464.2M          50-029-21236                    020585          # 01    P12460FT           13 3/8" @ 6673

0181  70 29'15.086" N   438,365.4M      06    P.N.J.V. RIG 1, SEAL GRAV. IS.  011284  020184  39 FT             TD       TEMP PLUGGED AND ABANDONED
516   148 39'09.174"W   7,820,949.0M          50-029-21074                    012784  063084  # 01
------------------------------------------------------------------------------------  ----------------------------------
EXXON COMPANY USA         #BF, BEAUFORT SEA            0189, 0190, 0191, 0192, 0193                100    TBA    022681  ISLAND
                          BEECHEY POINT                                                                                  FUTURE

0191  70 23' 11.79" N   466615.0M       06    NABORS 27-E, BF-37 GRAV. IS.    121980  110181  18 FT             TD       PERM PLUGGED AND ABANDONED
654   147 53' 27.98"W   7,809,042.8M          55-201-00001                    102181  033182  # 01

0191  70 23' 11.79" N   466,601.9M      06    NABORS 27-E, BF-37 GRAV. IS.    122381  122781  18 FT             TD       PERM PLUGGED AND ABANDONED
654   174 53' 28.71"W   7,809,042.8M          55-201-00002                    122481  031582  # 02
--------------------------------------------------------------------------------------  --------------------------------
SHELL OIL COMPANY         #BF, BEAUFORT SEA            0195, 0196, 0197                            5      TBA    102381  TWO WEL
                          TERN                                                                                           FUTURE

0195  70 16' 46.02" N   481,320.1 M     06    BRINKERHOFF #84, TERN GRAV IS   022382  052082  21 FT             TD       TEMP PLUGGED AND ABANDONED
744   147 29' 45.61"W   7,796,938.9M          55-201-00003                    032382  091882  # 01

0196  70 16' 46.33" N   481,327 M       06    BRINKERHOFF #84, TERN GRAV IS   092282  101682  21 FT             TD       TEMP PLUGGED AND ABANDONED
745   147 29' 44.9" W   7,796,949 M           55-201-00004                    101482  030383  # 01
------------------------------------------------------------------------------------    --------------------------------
CHEVRON USA INC           #60, LOWER COOK INLET        0243                                        3      TBA    031083  ONE WEL
                          LOWER COOK INLET

0243  59 46' 45.42"N    522,450 M       05    KEY HAWAII JACKUP               011283  091984  115 FT            TD       PERM. PLUGGED AND ABANDONED
225   152 36' 0.60"W    6,626,691 M           55-220-00009                    083084  110684  # 01
------------------------------------------------------------------------------------  ---- .----------------------------
CHEVRON USA INC           #60, LOWER COOK INLET        0248, 0249                                  6      TBA    121782  1ST WEL
                          SHELLIKOF STRAITS                                                                              ABANDON

0248  58 20' 29.1" N    468,267.2M      05    SEDCO 712 SEMI                  101283  112184  549 FT            TD       PERM PLUGGED AND ABANDONED
654   153 32' 30.5 W    6,466,623.2M          55-249-00001                    110184  121884  # 01

0248  58 20'29.843"N    468,203.8M      05    SEDCO 712 SEMI                 020885  121884  546 FT            TD       PERM PLUGGED AND ABANDONED
654   153 32'30.189"W   6,466,638.0M          55-249-00003                   021185  031485  # 1A
----- ---------------------------------------------------------------------------------------- --------------------------
EXXON COMPANY USA         #71, DIAPIR FIELD, BEAUFORT  0261, 0262, 0272, 0274, 0279, 0280, 0296    22     TBA    091683  FIRST W
                          ANTARES                                                                                        0280 CU

0280  71 02' 10.05" N   510,020.9M      05    BEAUFORT SEA # 1, CIDS          040984  110184  49 FT             TD       PERM PLUGGED AND ABANDONED
971   152 43' 25.20"W   7,881,261.5M          55-232-00001                    092084  011885  # 01

0280  71 02' 10.00" N   510,019.4M      05    BEAUFORT SEA #1,CIDS            011085  011985  49 FT             TD       PLUGGING AND ABANDONING
971   152 43' 25.46"W   7,881,259.9M          55-232-00002                    011585          # 02                       7" @ 11596'
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ACTIVE EXPLORATION PLANS, NO APDS SUBMITTED AS OF 4/15/85

OPERATOR	SALE AREA PROSPECT	LEASE NUMBERS	DR SUB EP DC	STATUS EP APP	START END	WRTDPMX WTRDPMN	UNIT NAME AND TYPE PROP WELL DEPTHS	
TENNECO	#71, DIAPIR & #87, DIAPIR	0315, 0338, 0339, 0348, 0349, 0811 0812, 0813, 0814, 0815, 0816, 0817	011585 020485	APPROV 030685	85/86 TBA	61 FT. 41 FT.	CANMAR'S SSDC 8425 FT- 10350 FT	
SHELL OIL COMPANY	#71, DIAPIR FIELD, BEAUFORT HARVAND (SANDPIPER)	0370, 0371	111483 122083	APPROV 012084	P 1/84 TBA	49 FT 49 FT	GRAVEL ISLAND 12000'	
MARATHON OIL COMPANY	#70, ST. GEORGE BASIN AZALEA, LILY, PRIMROSE, SUNDEW	0486, 0488, 0498, 0499, 0521, 0525	 021985	APPROV 032185	SUM 85 FALL93	430 FT 421 FT	OCEAN ODYSSEY SEMI 12000 FT - 14000 FT	
AMOCO	#83/NAVARIN NICOLE,DANIELLE,MISHA,NANCY,AL AN,VIRGINIA,NATASHA	0598, 0632, 0639, 0674, 0694, 0707 0719	022085 032085	300REV	P5/85 TBA	504 FT 400 FT	TWO SEMISUBMERSIBLES 8000FT-13000FT	
UNION OIL COMPANY OF CALF	#87, DIAPIR FIELD, BEAUFORT HAMMERHEAD	0843, 0848, 0849, 0850	021385 031585	300REV	SUM 85	 100 FT	CANMAR EXP II DRSHP 8000-12000 FT	7
SHELL WESTERN E & P INC.	#87, DIAPIR FIELD, BEAUFORT CORONA	0871, 0872, 0882	021285 031585	300REV	SUM 85	 120 FT	CANMAR EXP II DRSHP 12000 FT	6

APPENDIX 'I'

PIPELINE COMPANIES - PRODUCING STATISTICS

ALASKA PIPELINE COMPANY
KENAI - ANCHORAGE
GAS PURCHASES MCF
1984

1984	KENAI GAS FIELD	BEAVER CREEK GAS FIELD	NORTH COOK INLET GAS FIELD ROYALTY GAS	WEST FORK GAS FIELD	BELUGA RIVER GAS FIELD	LEWIS RIVER GAS FIELD	MONTHLY TOTAL
January	3,626,816	858,596	29,539	4,073	--	--	4,519,024
February	3,300,914	915,655	--	3,536	--	--	4,220,105
March	2,272,500	973,363	--	3,570	--	--	3,251,433
April	2,127,558	612,728	--	3,466	--	--	2,743,752
May	1,624,505	622,346	--	3,337	--	--	2,250,188
June	1,336,636	599,729	--	1,983	--	--	1,938,348
July	1,356,747	620,281	--	3,166	--	--	1,980,194
August	1,519,025	624,983	--	2,495	--	--	2,146,503
September	1,923,725	562,551	--	2,948	--	53,295	2,542,519
October	2,165,790	935,429	--	3,034	62,404	243,361	3,410,018
November	3,217,144	890,758	--	2,357	247,060	39,888	4,397,207
December	3,246,674	940,961	608	1,069	232,335	359,005	4,780,652
Total Year	27,718,034	9,159,380	30,147	35,034	541,799	695,549	38,179,943
Average Month	2,309,836	763,282		2,920			3,181,662

ALYESKA PIPELINE SERVICE CO.
TRANS-ALASKA PIPELINE STATISTICS
1984

1984	THROUGHPUT PUMP STATION NO. 1 NET BBLS OIL	AVERAGE API GRAVITY	STORAGE VALDEZ NET BBLS OIL	NUMBER SHIPS LOADED	SHIP AVG. VOLUME NET BBLS OIL	SHIP LIFTINGS NET BBLS OIL
January	52,298,458	27.1	7,825,083	73	667,979	48,762,485
February	49,042,014	27.0	7,324,432	68	732,151	49,786,277
March	46,670,433	27.1	2,473,589	77	659,781	50,803,100
April	51,306,697	27.0	5,079,653	70	677,776	47,444,337
May	52,552,554	26.9	1,698,035	81	683,030	55,325,447
June	48,111,780	27.1	1,498,320	69	687,203	47,417,026
July	50,787,942	27.0	3,370,698	65	712,962	47,342,538
August	51,520,096	27.0	3,946,601	75	694,492	52,086,889
September	51,222,710	26.9	2,387,714	67	752,628	50,426,063
October	51,767,012	26.7	3,858,596	73	697,008	50,881,552
November	51,898,894	26.6	7,171,731	70	662,089	46,346,213
December	51,657,526	26.7	8,221,561	70	715,441	50,080,900
Total	608,836,116			858		595,702,827
Average Month	50,736,343			71.5	694,292	49,641,902

COOK INLET PIPE LINE COMPANY
RECEIPTS AND DELIVERIES
1984

1984	TOTAL RECEIPTS NET BBLS OIL	TOTAL DELIVERIES NET BBLS OIL	NO. OF TANKERS
January	1,466,409	1,476,766	5
February	1,336,866	1,376,843	4
March	1,492,378	1,777,681	5
April	1,449,784	975,164	3
May	1,450,103	1,422,124	4
June	1,330,335	1,562,446	5
July	1,408,737	1,594,687	4
August	1,402,219	1,016,717	3
September	1,314,044	1,512,334	4
October	1,280,535	1,383,371	4
November	1,235,727	1,308,091	4
December	1,213,160	1,213,278	3
Total	16,380,277	16,619,477	48
Average Month	1,365,023	1,384,956	4

Percent Intra-state 39

Average gravity on a monthly basis is 36 Degrees A.P.I.

KENAI PIPE LINE COMPANY
1984

1984	NET BBLS, OIL	AVERAGE API GRAVITY
January	515,548	37.7
February	493,258	37.7
March	529,585	38.3
April	515,677	38.2
May	521,060	38.0
June	491,933	37.9
July	482,417	37.2
August	464,387	37.7
September	457,139	37.8
October	495,712	38.2
November	469,179	38.3
December	480,397	38.2
Total	5,916,292	
Average Month	493,024	

KUPARUK TRANSPORTATION COMPANY
1984

1984	NET BBLS, OIL	AVERAGE API GRAVITY
January	3,977,937	25.0
February	3,804,425	24.9
March	3,796,580	24.8
April	3,345,834	24.8
May	3,373,645	25.7
June	3,302,489	25.1
July	3,354,893	24.9
August	3,171,602	24.8
September	3,374,485	25.0
October	4,026,575	24.8
November	4,952,533	24.9
December	5,656,902	25.0
Total	46,137,900	
Average Month	3,844,825	

TESORO ALASKA PIPELINE
KENAI - ANCHORAGE
PETROLEUM PRODUCTS SHIPMENT, BBLS
1984

1984	BBLS
January	720,910
February	809,810
March	824,063
April	797,209
May	882,111
June	915,833
July	897,074
August	1,032,129
September	766,461
October	808,252
November	857,084
December	750,136
Total Year	10,060,952
Average Month	838,413

Approximate Breakdown of Products Shipment

Gasoline 42%

Jet Fuel 47%

Heating Oil 11%

APPENDIX 'J'

ROYALTY OIL & GAS DATA BY FIELD

FIELD BELUGA RIVER
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION 1/68
OWNER AOEA, ARCO, Chevron, Shell
OPERATOR Chevron

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	1,548,438 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	175,561,305 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	763,084,062 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	19 %
ROYALTY	12.5%, Effective rate: 7.555%		
PURCHASER Chugach Electric, ENSTAR	/Bbl	/MCF	RIV: $ 0.21033 /MCF

LEASES State ADL: 17592, 17599, 17658, 21126, 21127, 21128, 21129
Federal AO: 29656, 29657

COMMENTS
Until recently, Chugach Electric was the only current purchaser of this gas. Chugach uses this gas for power generation which is delivered to the Anchorage market.

Enstar has recently purchased Beluga River gas under contract from Shell and just completed a pipeline from the field through the Mat-Su Valley to Anchorage.

Due to the existence of several Federal leases, the state's effective royalty share is 7.555%. Royalty ownership was reallocated by changing the ownership determination from surface acreage to reservoir percentage.

FIELD CANNERY LOOP
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION Field delineation underway
OWNER
OPERATOR Union

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Shut-in gas field.

Initial hydrocarbon equity ownership calculations underway.

FIELD DUCK ISLAND / SAG DELTA (ENDICOTT RESERVOIR)
LOCATION North Slope, onshore/offshore
BEGAN PRODUCTION Facilities design underway, production expected to begin in 1988.
OWNER
OPERATOR SOHIO

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Initial calculation of hydrocarbon ownership underway.

Unit area expansion application made in December, 1984.

FIELD EPPERSON KNOB UNIT AREA
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION Exploration to begin in 1985
OWNER
OPERATOR Alaska Crude Corporation

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS

FIELD   FALLS CREEK
LOCATION   Cook Inlet, onshore, east side
BEGAN PRODUCTION   Shut-in 1961
OWNER
OPERATOR   Chevron

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	0 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	10,983 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	13,000,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	0 %
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES   State ADL:

COMMENTS
Shut-in gas field.

FIELD   GRANITE POINT
LOCATION   Cook Inlet, offshore, west side
BEGAN PRODUCTION   12/67
OWNER   AMOCO, ARCO, Chevron, Getty, Mobil, Phillips, Superior, Texaco, Union
OPERATOR   AMOCO, ARCO, Texaco, Union

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	285,235 Bbl	204,099 MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	97,110,561 Bbl	84,793,308 MCF	MCF
ESTIMATED RESERVES AS OF 9/84	24,432,705 Bbl	24,163,112 MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	80 %	70 %	%
ROYALTY	12.5 %		
PURCHASER Tesoro	RIK: $24.004 /Bbl	/MCF	/MCF
ARCO*		RIV: $ 0.110	
AMOCO Platform*		RIV: $ 0.10	
Union*		RIV: $ 0.10	

* Small amount of casinghead gas sold to AMOCO for use on platform.

LEASES   State ADL: 17586, 17587, 17597, 18742, 18761, 18776, 33431

COMMENTS
All royalty oil from this field is taken in kind and sold to Tesoro.

Gas from this field is casinghead gas and was formerly flared. OGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72 and this gas is now recovered and used locally.

FIELD   GWYDYR BAY UNIT AREA
LOCATION   North Slope, onshore/offshore
BEGAN PRODUCTION   Field delineation underway
OWNER
OPERATOR   Conoco

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	30,000,000 Bbl*	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%

* William Van Dyke, personal communication, 10/10/84.

	OIL	Casinghead	Gas Well
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES   State ADL:

COMMENTS
Further exploration activities planned for 1985.

FIELD   HEMI SPRINGS UNIT AREA
LOCATION   North Slope, onshore
BEGAN PRODUCTION   Exploration to begin in 1984
OWNER
OPERATOR   ARCO

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES   State ADL:

COMMENTS
Unit agreement approved in 1984.

FIELD KAVIK
LOCATION North Slope, onshore
BEGAN PRODUCTION Suspended
OWNER
OPERATOR ARCO

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Shut-in gas field.

FIELD KENAI
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION 1/62
OWNER ARCO, Chevron, Marathon, Union
OPERATOR Union

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	9,076,597 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	11,877 Bbl*	MCF	1,310,682,825 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	763,310,620 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	66 %

* Natural gas liquids.

ROYALTY 12.5%, Effective rate: Kenai, 2.068795%; Kenai Deep, 0.0%

PURCHASER		OIL	Casinghead	Gas Well
	Alaska Pipeline	/Bbl	/MCF	RIV: $ 0.605 /MCF
	Chevron			RIV: $ 0.605
	City of Kenai			RIV: $ 0.29
	Marathon LNG			RIV: $ 2.02
	Rental gas (Swanson River oil field)			RIV: $ 0.18
	Union			RIV: $ 0.53
	Union-Chevron exchange			RIV: $ 0.605
			Weighted average:	$ 0.526

LEASES State ADL: 00593, 00594, 00588, 02411, 02497, 380223, 324390
Federal AO: 28047, 28035, 28056, 28103, 28140, 28142, 28143

COMMENTS
The Kenai Unit provides most of the gas sales in the Cook Inlet area. Estimated Alaska state royalty gas sales were approximately 195,000 MCF as of 1982.

The state does not receive the full 12.5% royalty share because of the predominance of Federal leases in the unit and the recent conveyance of land to Cook Inlet Region Inc. The price the state receved from its royalty share results from prices paid under existing contracts between the lessees and their purchasers.

FIELD IVAN RIVER
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION Shut-in 1966, suspended
OWNER
OPERATOR Chevron

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	0 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	26,000,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	0 %
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Shut-in gas field.

FIELD KATALLA
LOCATION Gulf of Alaska, onshore
BEGAN PRODUCTION Abandoned 1934
OWNER
OPERATOR Fee land

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	0 Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	154,000 Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Not reported Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Alaska Crude Corporation beginning exploration again in 1985.

FIELD LISBURNE RESERVOIR
LOCATION North Slope, onshore/offshore
BEGAN PRODUCTION Field delineation and facilities design underway, production expected to begin in 1986-87.
OWNER
OPERATOR ARCO

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	35,140 Bbl	36,178 MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	613,152 Bbl*	856,938 MCF	MCF
ESTIMATED RESERVES AS OF 9/84	399,683,740 Bbl**	1,899,674,399 MCF*	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	0 %	0 %	%

* Includes 28,897 Bbl NGL.
** William Van Dyke, personal communication, 10/10/84.

ROYALTY	12.5%		
PURCHASER	/Bbl	/MCF	/MCF
LEASES State ADL:			

COMMENTS

FIELD MCARTHUR RIVER
LOCATION Cook Inlet offshore, west side
BEGAN PRODUCTION 12/69
OWNER AMOCO, ARCO, Chevron, Getty, Marathon. Phillips, Union
OPERATOR Union

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	1,030,298 Bbl	501,795 MCF**	733,798 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	504,364,975 Bbl*	180,731,696 MCF**	105,347,362 MCF
ESTIMATED RESERVES AS OF 9/84	64,727,768 Bbl	21,483,845 MCF	33,215,816 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	89 %	89 %	66 %

* Includes 8,112,602 Bbl NGL.
** Includes tank vapors.

ROYALTY	12.5 %		
PURCHASER Tesoro	RIK: $28.04 /Bbl	/MCF	/MCF
LEASES State ADL:	17519, 17594, 17602, 18716, 18729, 18730, 18758, 18772, 18777, 21068		

COMMENTS
All royalty oil from this field is taken in kind and sold to Tesoro.

Gas from this field is casinghead gas and was formerly flared. DOGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72 and this gas is now recovered and used locally.

FIELD KUPARUK
LOCATION North Slope, onshore
BEGAN PRODUCTION 12/81
OWNER ARCO, BP, Chevron, Exxon, Mobil, Phillips, Sohio, Union
OPERATOR ARCO

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	3,498,390 Bbl	311,851 MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	104,868,433 Bbl	16,508,372 MCF	MCF
ESTIMATED RESERVES AS OF 9/84	1,040,000,000 Bbl*	220,000,000 MCF*	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	6 %	7 %	%

* William Van Dyke, personal communication, 10/10/84.

ROYALTY	12.5 %		
PURCHASER All owners	RIV: $16.83643 /Bbl*	RIV: $2.992356	/MCF

* Weighted average, with field costs.

LEASES State ADL: 25512, 25513, 25519, 25520, 25521, 25522, 25523, 25531, 25547, 25548
25569, 25570, 25571, 25585, 25586, 25587, 25588, 25589, 25590, 25603
25604, 25605, 25628, 25629, 25630, 25631, 25632, 25633, 25634, 25635
25636, 25637, 25638, 25639, 25640, 25641, 25642, 25643, 25644, 25645
25646, 25647, 25648, 25649, 25650, 25651, 25652, 25653, 25654, 25655
25656, 25657, 25658, 25659, 25660, 25661, 25664, 25665, 25666, 25667
25668

COMMENTS
Unit Area expansion approved in 1984.

FIELD LEWIS RIVER
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION 1984
OWNER
OPERATOR Cities Service

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	0 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	33,295 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	22,000,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	0 %

ROYALTY	RIV: 12.5%		
PURCHASER	/Bbl	/MCF	/MCF
LEASES State ADL:			

COMMENTS
Short term gas sales to Enstar began in 1984.

FIELD NICOLAI CREEK
LOCATION Cook Inlet, onshore-offshore, west side
BEGAN PRODUCTION 10/68, now shut-in
OWNER Superior, Texaco
OPERATOR Texaco

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	0 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	1,062,055 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	3,000,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	26 %
ROYALTY	12.5 %		
PURCHASER AMOCO	/Bbl	/MCF	RIV: $ 0.13 /MCF

LEASES State ADL: 17585, 17590, 63279
Federal A0: 34161

COMMENTS
Gas from this small field, when produced, is used only by platform and shore production facilities. At present there is no production and no prospective purchaser for the state's royalty share.

FIELD NORTH COOK INLET
LOCATION Cook Inlet, offshore, mid-channel
BEGAN PRODUCTION 3/69
OWNER Phillips
OPERATOR Phillips

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	3,814,191 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	675,098,122 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	824,672,203 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	45 %
ROYALTY	12.5 %		
PURCHASER Alaska Pipeline Phillips	/Bbl	/MCF	RIV: $2.3405 /MCF

LEASES State ADL: 17589, 17590, 18740, 18741, 37831

COMMENTS
Gas from this field is primarily delivered to the Phillips LNG plant and subsequently sold in Japan.

FIELD MIDDLE GROUND SHOAL
LOCATION Cook Inlet, offshore, east side
BEGAN PRODUCTION 9/67
OWNER AMOCO, ARCO, Chevron, Getty, Phillips, Shell
OPERATOR AMOCO, Shell

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	273,544 Bbl	185,009 MCF	27,835 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	143,180,432 Bbl	71,657,498 MCF	586,476 MCF
ESTIMATED RESERVES AS OF 9/84	12,538,105 Bbl	9,334,920 MCF	Not reported MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	92 %	88 %	N/A %
ROYALTY	12.5 %		
PURCHASER Tesoro	RIK: $20.17 /Bbl	/MCF	/MCF

LEASES State ADL: 17595, 18744, 18746, 18754, 18756

COMMENTS
All royalty oil produced from this field is taken in kind and sold to Tesoro.

Recent increases in gas prices may encourage a reevaluation of this gas.

Gas from this field is casinghead gas and was formerly flared. DOGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72 and this gas is now recovered and used locally.

FIELD MILNE POINT
LOCATION North Slope, onshore
BEGAN PRODUCTION Field delineation and facilities design underway, production expected to. begin in 1986.
OWNER
OPERATOR Conoco

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	60,000,000 Bbl*	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%

* William Van Dyke, personal communication, 10/10/84.

ROYALTY	Estimated effective rate, 16%.		
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Unit area expansion approved during 1983.

FIELD PRUDHOE BAY - SADLEROCHIT RESERVOIR
LOCATION North Slope, onshore
BEGAN PRODUCTION 10/69
OWNER Amerada-Hess, ARCO, BP, Chevron, Exxon, Getty, LL&E, Marathon, Mobil, Petro-Lewis, Phillips, SOHIO
OPERATOR ARCO, Sohio

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	46,816,092 Bbl	6,209,313 MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	3,634,014,931 Bbl	402,116,096 MCF	MCF
ESTIMATED RESERVES AS OF 9/84	6,343,000,000 Bbl†	29,000,000,000 MCF†	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	36 %	1 %	%

† William Van Dyke, personal communication, 10/10/84.

ROYALTY		12.5 %, Weighted average: $18.09916		
PURCHASER	Mapco-GVEA*	RIK: .213334 of Royalty	/MCF	/MCF
	Tesoro*	RIK: .21208 of Royalty		
	Chevron*	RIK: .096 of Royalty		

* New contracts effective 4/1/85.

LEASES State ADL: 28238, 28239, 28240, 28241, 28244, 28245, 28246, 28257, 28258, 28260
28260, 28261, 28262, 28263, 28264, 28265, 28275, 28276, 28277, 28278
28279, 28280, 28281, 28282, 28283, 28284, 28285, 28286, 28287, 28288
28289, 28290, 28299, 28300, 28301, 28302, 28303, 28304, 28305, 28306
28307, 28308, 28309, 28310, 28311, 28312, 28313, 28314, 28315, 28316
28320, 28321, 28322, 28323, 28324, 28325, 28326, 28327, 28328, 28329
28330, 28331, 28332, 28333, 28334, 28335, 28339, 28343, 28344, 28345
28346, 28349, 34628, 34629, 34630, 34631, 34632, 47446, 47447, 47448
47449, 47450, 47451, 47452, 47453, 47454, 47469, 47471, 47472, 47475
47476

COMMENTS
The state's royalty share of oil produced is 12.5%, with 14.9% of this share presently being taken in kind and sold to North Pole Refinery and Golden Valley Electric Assn. An additional 35.5178% of the state's share is taken in kind and sold to Tesoro. The remainder is taken in value. Additional royalty oil sales in 1984 are contemplated to be taken in value.

Small amounts of produced gas are presently sold to the operator of the Trans-Alaska Pipeline. The state is receiving royalty in value with the gas price being set by the owners of the gas. There presently is no other market. The state's royalty share of gas sales is 12.5%.

Unit Area expansion approved 1984, with additional development work continuing.

FIELD NORTH FORK
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION Shut-in 1965
OWNER
OPERATOR Chevron

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	0 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	104,395 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	12,000,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	1 %

ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Shut-in gas field.

FIELD NORTH MIDDLE GROUND SHOAL
LOCATION Cook Inlet, offshore, mid-channel
BEGAN PRODUCTION No production, abandoned 1975
OWNER
OPERATOR

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%

ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS

FIELD PRUDHOE BAY - SAG RIVER RESERVOIR
LOCATION
BEGAN PRODUCTION
OWNER
OPERATOR

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	130,000,000 Bbl*	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%

* William Van Dyke, personal communication, 10/10/84.

ROYALTY

PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS

FIELD POINT THOMSON UNIT AREA
LOCATION North Slope, onshore/offshore
BEGAN PRODUCTION Shut-in
OWNER
OPERATOR EXXON

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	400,000,000 Bbl*	5,000,000,000 MCF*	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%

* William Van Dyke, personal communication, 10/10/84.

ROYALTY

PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Unit Area expansion approved in 1984. Market analysis underway to determine development potential.

FIELD REDOUBT SHOAL
LOCATION Cook Inlet, offshore, mid-channel
BEGAN PRODUCTION Abandoned
OWNER
OPERATOR

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	0 Bbl	0 MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	1,396 Bbl	456 MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Not reported Bbl	Not reported MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	N/A %	N/A %	%

ROYALTY

PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS

FIELD SOUTH MCARTHUR RIVER UNIT AREA
LOCATION Cook Inlet, offshore
BEGAN PRODUCTION Further exploration pending
OWNER
OPERATOR Mobil

	OIL	GAS Casinghead	 Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%

ROYALTY

PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Unit agreement likely to terminate in 1985.

FIELD STERLING
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION 3/62
OWNER Marathon, Union
OPERATOR Union

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	1,116 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	2,066,400 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	22,989,950 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	8 %
ROYALTY	12.5%, Effective rate, 1.55461%		
PURCHASER Sport Lake Greenhouse	/Bbl	/MCF	$ 0.40 /MCF

LEASES State ADL: 02497, 329912, 324299

COMMENTS
Since Federal and Cook Inlet Region Inc. leases are involved, the state's royalty share is approximately 1.6%. The only gas sold from this field is consumed locally.
There is no gas pipeline currently available to deliver this gas from this field to any other market.
Because of limited reserves, there is no current prospect of additional markets.

FIELD STUMP LAKE UNIT AREA
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION Suspended
OWNER
OPERATOR Chevron

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Shut-in gas field.

FIELD THEODORE RIVER (PRETTY CREEK UNIT AREA)
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION Suspended
OWNER
OPERATOR Chevron

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Shut-in gas field.

FIELD TRADING BAY
LOCATION Cook Inlet, offshore, west side
BEGAN PRODUCTION 12/67
OWNER Marathon, Union
OPERATOR Union

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	51,636 Bbl	75,832 MCF	55,991 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	85,793,576 Bbl*	57,380,640 MCF**	1,841,467 MCF
ESTIMATED RESERVES AS OF 9/84	2,533,476 Bbl	2,317,509 MCF	29,496,081 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	97 %	96 %	6 %

* includes 346,343 Bbl NGL.
** Includes tank vapors.

	OIL	GAS Casinghead	GAS Gas Well
ROYALTY	12.5 %		
PURCHASER Tesoro	RIK: $26.43 /Bbl**	/MCF	/MCF

** Weighted average.

LEASES State ADL: 18731

COMMENTS
All royalty oil from this field is taken in kind and sold to Tesoro.

Gas from this field is casinghead gas and formerly was flared. AOGC Flaring Order 0104, 6/30/71, has prohibited flaring since 7/1/72, and this gas is now recovered and used locally.

FIELD WEST FORK
LOCATION Cook Inlet, onshore,east side
BEGAN PRODUCTION
OWNER
OPERATOR

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	3,300 MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	1,311,904 MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	5,969,943 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	20 %
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:
Federal AA:

COMMENTS
Shut-in gas field.

FIELD WEST MIKKELSEN
LOCATION North Slope, onshore/offshore
BEGAN PRODUCTION Further exploration pending
OWNER
OPERATOR ARCO, Shell

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Unit likely to terminate in 1985.

FIELD WEST SAK RESERVOIR
LOCATION North Slope, onshore
BEGAN PRODUCTION Pilot production underway
OWNER
OPERATOR ARCO, Conoco

	OIL	GAS	
		Casinghead	Gas Well
AVERAGE MONTHLY PRODUCTION AS OF 1-9/84	Bbl	MCF	MCF
CUMULATIVE NET PRODUCTION AS OF 9/84	Bbl	MCF	MCF
ESTIMATED RESERVES AS OF 9/84	750,000,000 Bbl	MCF	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 9/84	%	%	%
ROYALTY			
PURCHASER	/Bbl	/MCF	/MCF

LEASES State ADL:

COMMENTS
Reservoir delineation and engineering/geological studies continuing.

S/B Tbl: Apdxa, rev: 1/8/85

APPENDIX 'K'

ARCTIC PETROLEUM OPERATORS ASSOCIATION MEMBER COMPANIES AND REPORTS CATALOGUE

APOA MEMBER COMPANIES

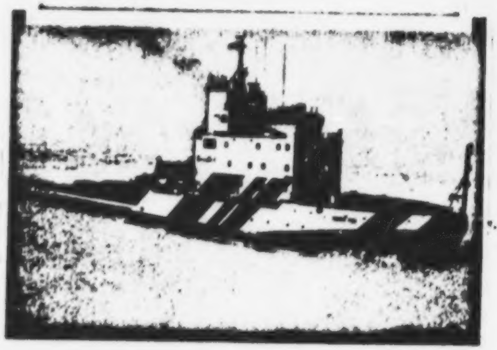
Bow Valley Industries Ltd.
BP Exploration Canada Limited
Canadian Superior Oil Ltd.
Canterra Energy Ltd.
Chevron Canada Resources Ltd.
Consolidex Gas and Oil Limited
Dome Petroleum Limited
Esso Resources Canada Limited
Gulf Canada Resources Inc.
Home Oil Company Limited
Mobil Oil Canada Ltd.
Norcen Energy Resources Limited
Panarctic Oils Ltd.
PanCanadian Petroleum Limited
Petro-Canada
Placid Northern Oils Ltd.
Shell Canada Resources Limited
Suncor Inc.
Texaco Canada Resources Ltd.
Union Oil Company of Canada Limited

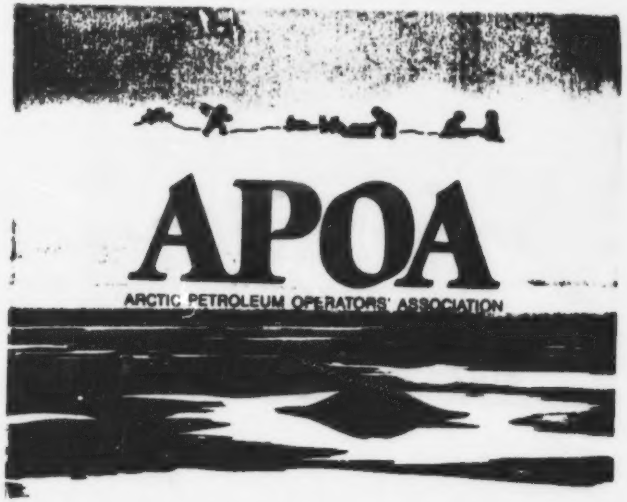
For further information please address:

APOA Information Service
Box 1281, Postal Station M
Calgary, Alberta, Canada
T2P 2L2
(403) 236-2344

or,

Executive Director
Arctic Petroleum Operators' Association
1902, 727 - 6th Avenue S.W.
Calgary, Alberta
T2P 0V1





APOA

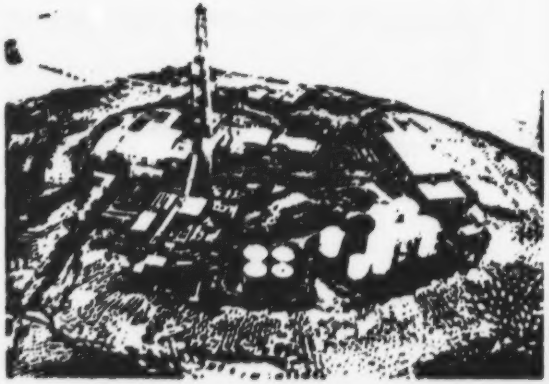
ARCTIC PETROLEUM OPERATORS' ASSOCIATION

THE ARCTIC PETROLEUM OPERATORS' ASSOCIATION

The Arctic Petroleum Operators' Association was formed in 1970 as a non-profit industry research organization under the joint sponsorship of a group of oil companies with interests in the Canadian Arctic. The main objective of the Association was, and is today, the coordination of efficient and cost-effective Arctic research projects.

APOA research is conducted on a participation basis. Member companies fund projects on a voluntary basis, with those companies sharing the apportioned costs receiving the study results. Over the past 14 years, APOA has sponsored over 200 research projects at a cost of more than $53 million. APOA research projects include a wide range of topics relevant to hydrocarbon exploration throughout the Arctic. Environmental research in the Beaufort Sea, Mackenzie Delta, High Arctic and Eastern Arctic regions has included studies of seabirds, marine mammals, lower life forms, climate, oceanography, and geomorphology. A number of studies have been dedicated to the various forms of sea-ice and icebergs in each of these regions, including theoretical modelling, and field measurements of the strength and behavior of ice and its effects on structures. Other APOA projects relate to the design, evaluation and testing of Arctic vehicles, as well as other aspects of Arctic transportation, such as road construction. Oil spills, including spilled oil behavior and oil spill countermeasures and contingency actions, have been examined through various APOA projects. Certain APOA projects have sought to refine Arctic drilling operations, logistics and the design of suitable, safe and effective drilling units.

Membership in the Association has varied since its inception, with between 15 and 35 companies participating. At present, APOA is comprised of 20 active members. The Association is administered through a Board of Directors, consisting of a Chairman, Vice-chairman, Executive Director, and five Directors. The Board is elected from among the member companies.



In addition to research, APOA supports communications among persons and agencies involved with northern development, and between government and industry associations, through technical workshops and the sharing and dissemination of information. As well, APOA is involved in the development of operating techniques and enhanced safety procedures for northern hydrocarbon exploration.

A significant part of the Association's work is undertaken through seven standing committees: Environmental, Oil Spill, Drilling and Production, Offshore and Remote Medicine, Remote Sensing, Safety, and Public Information. With the exception of Public Information, each committee is operated jointly with the Offshore Operators Division of the Canadian Petroleum Association (CPA), formerly the Eastcoast Petroleum Operators' Association (EPOA), and apply their efforts to projects pertinent to their spheres of responsibility. As an example, the Offshore and Remote Medicine Committee has reviewed medical concerns in Beaufort Sea operations and successfully arranged a course for upgrading the skills of rig medics. The APOA/EPOA Offshore Safety Task Force, whose report on offshore safety was published in December, 1983, was formed under the auspices of the Safety Committee.

APOA and EPOA co-founded the Canadian Offshore Oil Spill Research Association (COOSRA) in 1980, a five-year, $5 million program with the objective of investigating oil spill countermeasures in Canadian offshore regions. APOA works closely with the Alaska Oil and Gas Association (AOGA) and APOA members have access to some 220 AOGA research projects. Through this sharing of information, costly duplication of effort is minimized among the respective member companies. Also, APOA has been an active supporter of the Arctic Land Use Research (ALUR) program since its inception.

APOA work has included a number of programs oriented to operational techniques, complementing APOA operations research. For example, some ten years ago, APOA was involved in the creation of a blow-out prevention training facility and related courses, still being operated by the Petroleum Industry Training Service.

APOA participates in other joint government/industry programs through Committee and Task Force representation. These initiatives have included the 1979 Joint Government/Industry Steering Committee on Problems of Arctic Hydrocarbon Development (SCOP), and the 1982 Steering Committee on the Disposal of Waste Drilling Fluids in Arctic Regions. At present, APOA is actively assisting the federal government in the organization of its Environmental Studies Revolving Fund (ESRF) under the Canada Oil and Gas Lands Administration (COGLA).

Since 1970, APOA has co-sponsored (with the Canadian Petroleum Association and recently with government departments) an annual Environmental Workshop. The workshops have been held variously in Calgary, Alberta; Fairmont, B.C.; Montebello, Quebec; Yellowknife, N.W.T.; and Whitehorse, Yukon. These workshops have contributed to an ever improved liaison and understanding between various involved government, academic, industry, media and public interest groups in relevant environmental, technical and governmental topics of interest. Other, more specialized, workshops have been conducted under the auspices of a number of APOA Standing Committees.

Public information and the dissemination of information is an important part of APOA activities. APOA played a leading role in the founding of the Arctic Science and Information System at the Arctic Institute of North America in Calgary. Over 300 APOA Study Reports have been placed in 23 reference libraries across Canada, in the United States and Great Britain. As well, these reports are available for purchase. The Association also publishes the APOA Review in English and Inuktitut, a magazine dedicated to the history, content and progress of research undertaken by APOA, and the inter-relationship and relevance of various study projects and Arctic operations.

ENVIRONMENTAL STUDIES

Beaufort Sea

		Prices Fiche	 Paper
3-1	**1970 Bottom Sampling Program – South Coast of Beaufort Sea Mackenzie Bay to Liverpool Bay, N.W.T.** Golder, Brawner and Associates Ltd. for Imperial Oil Limited, 1970.	12.00	39.00
4-1	**Geological Sampling and Analytical Program – Beaufort Sea** M.M. Lerand, Gulf Oil Canada Limited, 1971.	24.00	95.00
4-2	**Offshore Permafrost, Southern Beaufort Sea** J. Ross Mackay, U.B.C., 1972.	6.00	9.00
17-3	**Micropaleontologic-Mineralogic Analysis of Recent Mud Samples From Ice Scoured Surface of Beaufort Shelf** M.M. Lerand, Gulf Oil Canada Limited, 1971.	6.00	3.25
70-1	**Normal and Extreme Winds and Waves in the Canadian Southern Beaufort Sea** Intersea Research Corporation for Imperial Oil Company Ltd., 1974.	12.00	41.75
72-1	**Distribution and Abundance of Seals in the Eastern Beaufort Sea** Stirling, et al. Department of the Environment, 1975.	10.50	35.00
72-2	**The Distribution and Abundance of Polar Bears in the Eastern Beaufort Sea** Andriashek, et al. Department of the Environment, 1975.	10.50	36.00
72-3a	**Seabirds of the Southeastern Beaufort Sea: Summary Report** Thomas Barry. Department of the Environment, 1976.	5.25	28.00
72-3b	**Seabirds in the Southeastern Beaufort Sea: Aircraft and Ground Observations in 1972 and 1974** Kuyt, et al. Department of the Environment, 1975.	31.50	150.00
72-3c	**Bird Migration Along the Beaufort Sea Coast: Radar and Visual Observations in 1975** Richardson, et al. Department of the Environment, 1975.	15.75	77.00
72-4	**Bowhead and White Whales in the Southern Beaufort Sea** Fraker, et al. Department of the Environment, 1978.	15.75	75.00
72-5	**Effect of Contact and Ingestion of Crude Oil on Ringed Seals** Smith and Geraci. Department of the Environment, 1975.	10.50	40.00
72-6	**Fishes of the Yukon Coast** Kendel, et al. Department of the Environment, 1975.	15.75	66.00
72-8	**Fishes of the Outer Mackenzie Delta** Roger Percy. Department of the Environment, 1975.	15.75	73.00
72-9	**Nitrogen Fixation in Arctic Marine Sediments** R. Knowles. Department of the Environment, 1975.	5.25	25.00
72-10	**Biodegradation of Crude Petroleum by the Indigenous Microbial Flora of the Beaufort Sea** Bunch and Harland. Department of the Environment, 1976.	10.50	33.00
72-11	**Effects of Crude Oils on Arctic Marine Invertebrates** Percy & Mullin. Department of the Environment, 1975.	21.00	94.00
72-12a	**Biological Productivity of the Southern Beaufort Sea: the Physical-Chemical Environment and the Plankton** Grainger. Department of the Environment, 1975.	10.50	46.00
72-12b	**Biological Productivity of the Southern Beaufort Sea: Zoobenthic Studies** Wacasey. Department of the Environment, 1975.	5.25	22.00
72-12c	**Biological Productivity of the Southern Beaufort Sea: Phytoplankton and Seaweed Studies** Hsiao. Department of the Environment, 1976.	10.50	56.00
72-13	**Tar and Particulate Pollutants on the Beaufort Sea Coast** Wong, et al. Beaufort Sea Project, 1976.	10.50	55.00

		Prices Fiche	 Paper
72-14	**Baseline Data on Chemical Oceanography in the Southern Beaufort Sea, 1974-75** Wong, et al. Institute of Ocean Sciences, n.d.	10.50	41.00
72-15	**Mackenzie River Input to the Beaufort Sea** K.F. Davies. Department of the Environment, 1975.	10.50	41.00
72-16	**Near Bottom Currents and Offshore Tides** Huggett, et al. Department of the Environment, 1975.	5.25	22.00
72-17	**Open Water Surface Currents** MacNeill, et al. Department of the Environment, 1975.	15.75	66.00
72-18	**Physical Oceanography of the Southeastern Beaufort Sea** Herlinveaux and de Lange Boom. Department of the Environment, 1975.	10.50	58.00
72-19	**Storm Surges** R.F. Henry. Department of the Environment, 1975.	5.25	23.00
72-20	**Real-Time Environmental Prediction System** Clodman & Muller. Department of the Environment, 1975.	15.75	77.00
72-21	**Weather, Waves and Icing in the Beaufort Sea** Berry, et al. Department of the Environment, 1975.	15.75	79.00
72-22	**Permafrost and Frozen Sub-Seabottom Materials in the Southern Beaufort Sea** Hunter, et al. Department of the Environment, 1976.	21.00	104.00
72-24	**Coastal Sedimentary Processes and Sediments, Southern Beaufort Sea** Lewis & Forbes. Department of the Environment, 1975.	10.50	38.00
72-25a	**Sediment Dispersal in the Southern Beaufort Sea** B.R. Pelletier. Department of the Environment, 1975.	10.50	44.00
72-25b	**Suspended Matter in the Southern Beaufort Sea** B.D. Bornhold. Department of the Environment, 1975.	5.25	19.00
72-32	**Socio-Economic Importance of Marine Wildlife Utilization** W.D. Brackel. Department of the Environment, 1977.	10.50	55.00
72-34	**Satellite Observation of the Beaufort Sea Cover** J. Marko. Department of the Environment, 1975.	15.75	80.00
72-38	**Hydrocarbon Levels in the Marine Environment of the Southern Beaufort Sea** MacDonald, et al. Department of the Environment, 1976.	15.75	66.00
72-40	The Birds of the Beaufort Sea Stephen R. Johnson, William J. Adamas and Michael R. Morrell. LGL Limited, 1975.	18.00	62.50
72-39	**Offshore Drilling for Oil in the Beaufort Sea: a Preliminary Environmental Assessment** Milne & Smiley. Department of the Environment, 1976.	5.25	24.00
73-1	**Disposal of Waste Drilling Fluids in the Canadian Arctic** Beak Consultants for Imperial Oil Limited, 1974.	24.00	92.00
74-1V1	**Banks Island Development Environmental Considerations 1974 Research Studies** Beak Consultants for Panarctic Oils, 1975.	24.00	86.50
74-1V2	**Banks Island Development Environmental Considerations 1974 Research Studies** Beak Consultants for Panarctic Oils, 1975.	24.00	97.00
74-1V3	**Banks Island Development Environmental Considerations 1974 Research Studies** Beak Consultants for Panarctic Oils, 1975.	24.00	102.00
173-1	The Biological Resources of the Southeastern Beaufort Sea, Amundsen Gulf, Northern Mackenzie Delta and Adjacent Coastal Areas: A Selected Annotated Bibliography LGL Limited, 1982.	72.00	218.00

Mackenzie Delta

11-1	**Mackenzie Delta Project: Final Report** Environmental Research Associates, 1970.	6.00	17.00

		Prices	
		Fiche	Paper
42-1	Gravel Inventory Survey, Richards Island and Adjacent Areas J.D. Mollard and Associates Limited, 1972.	18.00	75.50
61-1	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Volume 1 – Meteorology and Climate F.F. Slaney and Company Limited, 1974.	18.00	55.50
61-2	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Volume 2 – Hydrology F.F. Slaney and Company Limited, 1974.	12.00	39.00
61-3	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Volume 3 – Landform and Vegetation F.F. Slaney and Company Limited, 1974.	24.00	90.25
61-4	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Volume 4 – Birds F.F. Slaney and Company Limited, 1974.	30.00	128.25
61-5	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Volume 5 – Mammals F.F. Slaney and Company Limited, 1974.	24.00	97.75
61-6	1972-74 Environmental Program, Mackenzie Delta, N.W.T.: Volume 6 – Aquatic Resources F.F. Slaney and Company Limited, 1974.	30.00	114.75
61-7	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Volume 7 – Environmental Quality F.F. Slaney and Company Limited, 1974.	12.00	42.75
61-8	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Winter Study Supplement F.F. Slaney and Company Limited, 1974.	18.00	69.00
61-9	1972-1974 Environmental Program, Mackenzie Delta, N.W.T.: Impact Assessment F.F. Slaney and Company Limited, 1974.	54.00	235.00
76-1V1	1974 Summer Environmental Program – Mackenzie River Estuary: Volume 1 – Aquatic Studies F.F. Slaney and Company Limited, 1975.	42.00	173.00
76-1V2	1974 Summer Environmental Program – Mackenzie River Estuary: Volume 2 – Terrestrial Studies F.F. Slaney and Company Limited, 1975.	18.00	79.50
76-1V3	1974 Summer Environmental Program – Mackenzie River Estuary: Volume 3 – Marine Mammal Studies F.F. Slaney and Company Limited, 1975.	18.00	60.00
	Eastern Arctic		
35-1	Wind, Waves, Weather and Icebergs in Baffin Bay and Davis Strait Summer 1972 [Environmental Data Appendix] Marine Environmental Services Limited, 1972.	6.00	20.25
35-2	Environmental Conditions in Baffin Bay and Davis Strait, Including Presentation of Data Collected During Summer 1972 Marine Environmental Services Limited, 1972.	12.00	55.00
78-1	Arctic Environmental Observations – M/V Arctic Explorer [Collected Meteorological and Ice Logs] Marine Environmental Services Limited, 1974.	12.00	52.25
126-1	Biological Literature Review of Davis Strait Draft Report MacLaren Atlantic Limited, n.d.	18.00	56.50
127-1	Report on the Davis Strait Aerial Survey 77-1 MacLaren Atlantic Limited, 1977.	6.00	11.75
127-2	Report on Cruise 77-1, February 1977: Environmental Aspects of the Cruise to Davis Strait and the Labrador Coast MacLaren Atlantic Limited, 1977.	18.00	67.75
128-1	Davis Strait Ice and Oceanographic Investigations Winter 1976-77 Fenco Consultants Ltd., 1977.	48.00	207.75
129-1V1	East Coast Mooring Program: Analytical Phase, Volume 1 Martec Limited, 1976.	12.00	41.75
129-1V2	East Coast Mooring Program: Analytical Phase, Volume 2 Martec Limited, 1976.	24.00	94.00

		Prices	
		Fiche	Paper
134-1	Report on Biological Cruises, Offshore Cruises 77-2 and 77-3, April - June, 1977 in the Davis Strait MacLaren Atlantic Limited, 1978.	24.00	94.00
134-1A	Report on Biological Cruises, Offshore Cruises 77-2 and 77-3, April - June, 1977 in the Davis Strait: Appendix MacLaren Atlantic Limited, 1978.	48.00	171.50
135-1	Report on Cruise II, July, 1976, Environmental Aspects of Imperial Oil Cruise to Flemish Pass and Davis Strait MacLaren Atlantic Limited, 1976.	12.00	42.25
135-2	Field Report on the Oceanographic Cruises During April, July - August, October - November, 1976 MacLaren Atlantic Limited, 1977.	12.00	45.75
135-3	Report on Cruise III, October - November, 1976 and Cruise IV, November - December, 1976, Environmental Aspects of the Imperial Oil Cruises to Davis Strait, Hudson Strait, and Flemish Pass MacLaren Atlantic Limited, 1977.	30.00	123.50
138-1	The Coastal Environment of Southern Baffin Island and Northern Labrador - Ungava Barry, et al. Institute of Arctic and Alpine Research, University of Colorado, 1977.	24.00	85.00
138-2	Report on Biological Literature Review of the Labrador Sea Region MacLaren Atlantic Limited, 1977.	54.00	68.00
138-3V1	Report on Primary Data Collected for the 1977 Davis Strait Biological Programme and Analysed Prior to December 1977 – Volume 1 MacLaren Atlantic Limited, 1977.	30.00	150.50
138-3V2	Report on Primary Data Collected for the 1977 Davis Strait Biological Programme and Analysed Prior to December 1977 – Volume 2 MacLaren Atlantic Limited, 1977.	18.00	73.75
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118-1	**[Arctic Islands Winter Ice Movement Study] Volume 1: Summary Report, Ice Motion, Oceanographic and Meteorological Data** Innovative Ventures Ltd. for Panarctic Oils Ltd., 1977.	30.00	129.25
118-2	**[Arctic Islands Winter Ice Movement Study] Volume 2: Ice Motion Data Report** Innovative Ventures Ltd., n.d. [1977].	12.00	42.25
118-3	**[Arctic Islands Winter Ice Movement Study] Volume 3: Weather Data Report** Innovative Ventures Ltd., n.d. [1977].	30.00	166.75
118-4	**[Arctic Islands Winter Ice Movement Study] Volume 4: Current Meter Data Report** Innovative Ventures Ltd., n.d. [1977].	24.00	109.50
118-5	**[Arctic Islands Winter Ice Movement Study] Volume 5: Installation Report** Innovative Ventures Ltd., n.d. [1977].	6.00	5.75
118-6	**[Arctic Islands Winter Ice Movement Study] Volume 6: Interm Report of Installation and Ice Motion** Innovative Ventures Ltd., n.d. [1977].	6.00	3.75
118-7	**[Arctic Islands Winter Ice Movement Study] Volume 7: Interm Report of RAMS Buoys at Location 2** Innovative Ventures Ltd., n.d. [1977].	6.00	3.75
118-8	**Arctic Islands Ice Strain Measurement Study, 1977** W. Winsor, C-CORE, 1978.	6.00	25.75
118-9	**Arctic Islands Ice Motion Study by Doppler Satellite 1976-77 Winter Season** H.G. Falkenberg and Associates, 1977.	6.00	17.00
122-1	**Ice Pressure Measurements at Arnak L-30 and Kannerk G-42** A. Semeniuk, Imperial Oil Limited, 1977.	42.00	160.25
124-1	**Experimental Study of Ice Pile-Up** L.W. Rosenegger, Esso Resources Canada Limited, 1979.	12.00	42.00
125-1	**Experimental Ridge CRI Interaction** L.W. Rosenegger, Imperial Oil Limited, 1977.	24.00	117.50
130-3	**Engineering Properties of Ice in the Beaufort Sea** F.G. Bercha and Associates for Dome Petroleum Limited, 1976.	18.00	65.00
131-1	**A Bottom Mounted Under Ice Profiling System** Hermes Electronics, 1977.	18.00	68.00
133-1	**Report on Investigation of Sea-Bed Scouring in the Beaufort Sea (Phase III)** MacLaren Atlantic, 1977.	36.00	37.50
140-1	**Davis Strait Ice Survey (November - December 1977)** Maarten Van Ieperen (Innovative Ventures Ltd.) for Esso Production Research Division, Imperial Oil Limited, 1978.	24.00	66.00

		Prices Fiche	 Paper
142-1	**General Information on Ice Thickness, Queen Elizabeth Islands, NWT Arctic Islands 1977 Data** V.F. Wetzel, Suncor, 1978.	6.00	10.50
142-2	**Statistics of Ice Thickness Queen Elizabeth Islands, NWT 1977 Seismic Data** V.F. Wetzel, Suncor, 1978.	18.00	59.00
142-3	**Ice Thickness Profiles From Seismic Record 1977 Data** V.F. Wetzel, Suncor, 1978.	18.00	47.50
143-1	**Model Experiments to Determine the Forces and Behavior of Moving Ice Fields Against a Concrete Drilling Caisson** M.A. Dunne & R.Y. Edwards Jr., ARCTEC Canada Ltd., 1975.	12.00	34.50
144-1	**Ridge and CRI Interaction Tests** S.C. Crosby, Esso Resources Canada Limited, 1978.	18.00	65.00
148-1	**Stress Distribution During Continuous Crushing of Ice** P.R. Kry, Esso Resources Canada Limited, 1979.	18.00	63.50
149-4	**Some Iceberg Statistics for the Davis Strait** P.N. Trofimenkoff, Imperial Oil Limited, 1978.	6.00	24.00
150-1	**Model Tests of Sea Bottom Ice Scouring** R. Abdelnour & D. Lapp, Arctec Canada Ltd.	30.00	95.00

VEHICLES

		Fiche	Paper
7-1	**Preliminary Arctic Engineering Study of Surface Transport Vehicles** J.E. Rymes Engineering Ltd., 1970.	30.00	125.00
21-1	**Arctic Winter Test and Evaluation, Initial Stage, of Kenworth Truck Model 953A** J.E. Rymes Engineering Ltd., 1970.	6.00	25.00
21-2	**Arctic Winter Test and Evaluation, Mid-winter Stage, of Kenworth Truck Model 953A** J.E. Rymes Engineering Ltd., 1970.	6.00	35.25
21-3	**Arctic Winter Test and Evaluation, Late Winter Stage, of Kenworth Truck Model 953A** J.E. Rymes Engineering Ltd., 1970.	6.00	38.50
47-1	**Ice Chipper for Road Cutting on Sea Ice** J.D. Bennett, Sun Oil Company, 1974.	12.00	46.50
48-1	**Inspection of Winter Roads, Mackenzie Delta, Following Spring Thaw 1973** Muskeg Research Institute, University of New Brunswick, 1973.	6.00	9.50
48-2	**Winter Road Preparation and Commencement of Traffic in the Mackenzie Delta** Muskeg Research Institute, University of New Brunswick, 1973.	6.00	15.00
48-3	**Factors Affecting the Use of Winter Roads During Spring Thaw** Muskeg Research Institute, University of New Brunswick, 1973.	6.00	8.50
49-1	**Arctic Winter Evaluation Study, Transportation Equipment** J.E. Rymes Engineering Ltd., 1973.	24.00	102.00
56-1	**Technical Specifications of a Large Arctic Truck** J.E. Rymes Engineering Ltd., 1973.	18.00	61.00
90-1V1	**Ice Road Preparation With Mobile Chipping Equipment, Phase 1A, Volume I** Centurion Engineering and Innovative Ventures for Suncor, 1974.	12.00	66.00
90-1V2	**Ice Road Preparation With Mobile Chipping Equipment, Phase 1A, Volume II** Centurion Engineering and Innovative Ventures for Suncor, 1974.	18.00	105.00
90-2	**Ice Road Preparation With Mobile Chipping Equipment, Phase 1B** Centurion Engineering and Innovative Ventures for Suncor, 1974.	8.00	12.50
90-3	**Mobile Ice Chipper II** Centurion Engineering and Innovative Ventures, n.d.	12.00	43.00

		Prices Fiche	 Paper
101-1	**Mobile Arctic Ice Chipper as Modified and Tested in March 1976** K.W. Barrie, for Suncor, 1976.	6.00	30.00

CONTINGENCY

		Fiche	Paper
72-27	**The Interaction of Crude Oil with Arctic Sea Ice** NORCOR Engineering and Research Ltd. Department of the Environment, 1975.	21.00	110.00
72-28	**Movement of Oil Under Sea Ice** L.W. Rossenegger, Department of the Environment, 1975.	10.50	47.00
72-29	**Light Intensity and Primary Productivity Under Sea Ice Containing Oil** W.A. Adams. Department of the Environment, 1975.	15.75	88.00
72-31a	**Oil Spill Countermeasures for the Southern Beaufort Sea** W.J. Logan, D.E. Thornton and S.L. Ross, Environmental Protection Service, 1975.	18.00	52.50
72-31b	**Oil Spill Countermeasures for the Beaufort Sea: Appendix** W.J. Logan, D.E. Thornton, & S.L. Ross. Department of the Environment, 1975.	10.50	58.00
72-33	**Hydodynamics of an Oil Well Blowout** D.R. Topham, Department of the Environment, 1975.	5.25	29.00
72-35	**Oil, Ice & Climate in the Beaufort Sea** E.R. Walker, Ocean & Aquatic Sciences, DOE, 1975	6.00	20.00
97-1	**Tests of the Arctic Boat Configuration of the Lockheed Clean Sweep Oil Recovery System in a Broken Ice Field** L.A. Schultz, ARCTEC Canada Ltd., 1976.	12.00	38.00
100-1	**Proposal to Evaluate an Oil Containment Boom for Use in Ice-Infested Waters** ARCTEC Canada Ltd. for CANMAR Drilling Ltd., 1975.	6.00	11.75
100-2	**Evaluation of the Bennett-Canmar Oil Containment Boom** J.R. Nadreau, W.G. Wallace, R.Y. Edwards Jr., ARCTEC Canada Ltd., 1976.	6.00	23.00
107-1	**Some Aspects of Weathering and Burning of Crude Oil in a Water-and-Ice Environment** J. Belicek & J. Overall, NORCOR Engineering, 1976.	6.00	18.75
108-1	**In-Situ Burning of the Products of a Sub-Sea Blowout** ARCTEC Canada Ltd., T. Brzustowski (University of Waterloo), K. Aziz (University of Calgary), 1977.	12.00	39.50
114-1	**Preliminary Tests of Bird-Scare Devices on the Beaufort Sea Coast** P.L. Sharp, LGL Limited, 1978.	12.00	30.00
119-1	**Detection of Oil Trapped Under Ice Using Impulse Radar, Phase II Report** J.R. Mann, Geophysical Survey Systems Inc., with CRREL, 1976.	6.00	8.00
141-1	**Ignition and Burning of Crude Oil on Water Pools Under Arctic Springtime Conditions** Energetex Engineering, 1977.	12.00	40.00
149-1	**Sliktrak Simulations — East Coast** D. Bradfield, M. Metge, A. Telford, Imperial Oil Limited, 1977	6.00	17.50
149-2	**Oil in Pack Ice Coldroom Tests** M. Metge, Imperial Oil Limited, 1978.	6.00	16.50
149-3	**Deep Sea Dispersion Analyses** NORDCO Ltd., with R.H. Loucks Oceanology Limited, 1977.	6.00	24.00

DRILLING AND DRILLING UNITS

		Fiche	Paper
8-1	**[Arctic] Drilling Operations Guide** Arctic Petroleum Operators' Association, 1973.	24.00	89.00

		Prices	
		Fiche	Paper
12-1	**Feasibility Study, Exploratory Drilling Systems in the Beaufort Sea, Volume 1** Acres/Santa Fe for A.P.O.A., 1971.	18.00	87.50
12-2	**Feasibility Study, Exploratory Drilling Systems in the Beaufort Sea, Volume 2** Acres/Santa Fe for A.P.O.A., 1971.	24.00	112.25
13-1	**Arctic Drilling Barge Study** Westburne International Industries, Foundation Co. of Canada, SEDCO Inc., 1971.	24.00	118.50
30-1	**Beaufort Sea Exploratory Drilling System (Review and Recommendations)** Westburne International Industries & SEDCO Inc., 1971.	12.00	48.50
30-2	**Study of Beaufort Sea Exploratory Drilling Systems** Global Marine, Inc., 1971.	12.00	41.50
80-1	**SEDCO ICSDV [Ice Cutting Semi-Submersible Drilling Vessel] Phase I, Preliminary Design Study** SEDCO Inc. and Sea-Log Corp.; prepared by Earl & Wright Consulting Engineers, 1975.	36.00	181.50
94-1 V1	**Development of a Semi-Submersible Drilling System for the Arctic Offshore Area Phase II - Task II: Vol. 1 - Theoretical Investigations and Field Test Program on Disaggregation** Fenco Consultants Ltd., 1978.	30.00	91.00
94-1 V2	**Development of a Semi-Submersible Drilling System for the Arctic Offshore Area Phase II - Task II: Vol 2 - Hydraulic Clearing and Laboratory Tests** Fenco Consultants Ltd., 1978.	12.00	47.50
110-1	**Beaufort Sea Monopod Conceptual Design** Swan Wooster Engineering for Imperial Oil Limited, 1973.	12.00	68.50
110-2	**Soils Engineering Report, Beaufort Sea, Area Northwest of Richards Island** Cook, Pickering and Doyle Limited, 1973.	12.00	66.00
110-3	**A Monopod Drilling System for the Canadian Beaufort Sea** Imperial Oil Limited, 1973.	36.00	210.50
110-4	**Monopod Drilling Unit for the Beaufort Sea Design Criteria** Earl and Wright Engineers for Imperial Oil Limited, 1973.	12.00	N.A.
110-5	**Monopod Drilling Unit for the Beaufort Sea Cost Estimate November 1973** Earl and Wright Engineers for Imperial Oil, 1973.	18.00	81.00
110-6	**Monopod Drilling Unit for the Beaufort Sea Final Cost Estimate** Earl and Wright Engineers for Imperial Oil Limited, 1974.	36.00	205.50
110-7	**Monopod Drilling Unit for the Beaufort Sea Specifications for Construction and Outfitting** Earl and Wright Engineers for Imperial Oil, 1974.	42.00	220.50
110-9	**Model Tests of the Imperial Monopod Drilling Unit** Offshore Technology Corporation for Earl and Wright Engineers, 1973.	12.00	47.50
110-11	**Monocone Model Tests** Swan Wooster Engineering, 1975.	12.00	37.00
110-12	**Beaufort Sea Monopod Shear Key Test Program** Swan Wooster Engineering, 1974.	6.00	16.50
110-13	**[Engineering Drawings for Monopod Drilling Unit]** Earl and Wright Engineers, 1973.	18.00	N.A.
110-14	**A Preliminary Report on a Concrete Monopod Concept** Swan Wooster Engineering, 1974.	6.00	11.50
110-15	**Beaufort Sea Monocone Conceptual Design** Swan Wooster Engineering, 1974.	30.00	166.00
110-16	**Beaufort Sea Monocone Conceptual Design: Appendices** Swan Wooster Engineering, 1974.	18.00	85.00

		Prices	
		Fiche	Paper
110-18	**A Preliminary Report on a Fixed Concrete Cone** Swan Wooster Engineering, 1974.	6.00	18.00
130-1	**Preliminary Investigation of Potential Concepts for a Gas Production Platform for the Tingmiark Well in the Beaufort Sea** Crest Engineering Inc. for Dome Petroleum Limited, 1976.	12.00	40.00
130-2V1	**A Preliminary Analysis of Requirements for Development and Operation of Oil Fields in the Beaufort Sea, Phase I: Scoping Study. (Volume 1)** Crest Engineering Inc. for Dome Petroleum Limited, 1976.	18.00	56.00
130-2V2	**A Preliminary Analysis of Requirements for Development and Operations of Oil Fields in the Beaufort Sea, Phase II: Survey of Potential Structures. (Volume 2)** Crest Engineering Inc. for Dome Petroleum Limited, 1976.	18.00	60.00
130-2V3	**A Preliminary Analysis of Requirements for Development and Operation of Oil Fields in the Beaufort Sea, Bibliography. (Volume 3)** Crest Engineering Inc. for Dome Petroleum Limited, 1976.	42.00	125.00
152-1	**Permafrost Problems for Gravel Islands and Permafrost Data Collection Beaufort Sea Well Completions** Malcolm Goodman, Enertech Engineering and Research for Gulf Oil Canada Limited, 1978.	6.00	24.00
152-2	**Well Spacing Design Criteria for Permafrost - Beaufort Sea Well Completions** Malcolm Goodman, Enertech Engineering and Research for Gulf Oil Canada Limited, 1978.	6.00	22.00
153-1	**Drilling and Completion Wells Through In-situ Gas Hydrates; Survey and Evaluation of Arctic Field Experience** Malcolm Goodman, Enertech Engineering and Research for Canadian Marine Drilling Ltd., 1979.	12.00	32.00

OTHER STUDIES

		Fiche	Paper
2-3	**Logistics Operations A.P.O.A. Beaufort Sea Projects** J.G. Smith, Imperial Oil Limited, 1970.	12.00	36.75
17-4	**Report on Phase I of Pressure Ridge and Ice Island Study, Evaluation of Hovercraft and Ice Reconnaissance** J. Hnatiuk, 1971.	6.00	5.75
24-1	**A Study of Clothing Problems of the Operating Crews in the Arctic** S. Pang & A. Lock, Defence Research Establishment Ottawa, 1972.	12.00	32.50
34-1	**Northern Oil and Gas Related Employment Opportunities: The Impact of Mackenzie Delta Production** D. DePape, Boreal Institute, 1973.	24.00	88.75
39-1	**Arctic Offshore Pipeline Feasibility Study in the Mackenzie Delta Area** R.J. Brown and Associates, 1973.	54.00	242.50
45-1	**A Study of Arctic Clothing for Oil Operating Crews** S. Pang & A. Lock, Defence Research Establishment Ottawa, 1973.	6.00	23.50
45-2	**Testing of Commercial Arctic Clothing Submitted by the A.P.O.A.** R. Nolan, Defence Research Establishment Ottawa, 1973.	6.00	15.50
45-3	**Testing of Commercial Arctic Clothing Submitted by the A.P.O.A.; Addendum 1** R. Nolan, Defence Research Establishment Ottawa, 1973.	6.00	4.25
88-1	**Ya-Ya Lake Granular Resources Study 1975, Volume 1** EBA Engineering Consultants, 1975.	12.00	40.00
88-2	**Ya-Ya Lake Granular Resources Study 1975, Volume 2: Appendices** EBA Engineering Consultants, 1975.	12.00	63.50
88-3	**Ya-Ya Lake Granular Resources Study 1975, Volume 2[b]: Appendices** EBA Engineering Consultants, 1975.	48.00	250.00
139-1	**Operating Manual for the Gulf NAVSAT Buoy** Gulf Canada Resources, Inc., 1980.	6.00	7.00

ANNOUNCEMENT FOR UPCOMING APOA Review and Catalogue

Newly Released Reports

		PRICE	
		FICHE	PAPER
13-2 V1	WINDS, WAVES, AND STORMS IN THE SOUTHERN BEAUFORT SEA Volume I J.C. Freeman, Institute for Storm Reserach, 1971	24.00	75.00
13-2 V2	WINDS, WAVES, AND STORMS IN THE SOUTHERN BEAUFORT SEA Volume II J.C. Freeman, Institute for Storm Reserach, 1971	42.00	120.00
13-2 V3	WINDS, WAVES, AND STORMS IN THE SOUTHERN BEAUFORT SEA Volume III J.C. Freeman, Institute for Storm Reserach, 1971	18.00	58.00
73-2	REPORT ON CONTAINMENT AND DISPOSAL OF DRILLING FLUIDS IN THE NORTHWEST TERRITORIES Dames & Moore for APOA and the Government of Canada	12.00	36.75
110-10	SUPPLEMENT TO MODEL TESTS OF THE IMPERIAL MONOPOD DRILLING UNIT Earl and Wright, 1973	6.00	5.75
122-2	ICE CONDITIONS AROUND ARTIFICIAL ISLANDS 1976-1977 D. Favrat, Esso Resources Canada Limited, 1977.	12.00	38.00
136-1	SHORELINE OIL SPILL PROTECTION AND CLEANUP STRATEGIES: SOUTHERN BEAUFORT SEA MANUAL B.W. Worbets, 1979	NA	10.00
136-2	SHORELINE OIL SPILL PROTECTION AND CLEANUP STRATEGIES: SOUTHERN BEAUFORT SEA APPENDICE B.W. Worbets, 1979	NA	10.00
151-1	ANALYSIS OF SIDE SCAN SONAR SEA BED IMAGERY FROM REPEATED SURVEYS OFF PULLEN ISLAND - BEAUFORT SEA Jim Shearer, Gulf Canada Resources Inc., 1979	12.00	31.00
156-1	ICE ISLANDS AT NORMAN WELLS 1978-80 E.S. Vittoratos, Esso Resources Canada Limited, 1980.	18.00	58.00
157-1	TRACE METAL CHARACTERIZATION IN BARITE FOR DRILLING OPERATIONS Applied Earth Science Consultants, Inc., 1980.	18.00	56.00

Newly Released Reports continued....

161-1	MICROBIAL DEGRADATION OF CANMAR OILS BY NORTHERN MARINE MICROORGANISMS Dr. D.W.S. Westlake and Dr. F.D. Cook, University of Alberta,	6.00	13.00
164-1	FINAL REPORT ENVIRONMENTAL TESTING OF DOME AIR-DEPLOYABLE IGNITER Energetex Engineering, 1982	6.00	19.50
172-1	A CLIMATOLOGICAL STUDY OF THE SOUTHERN DAVIS STRAIGHT T.E. Keliher, G.E. Piatt, T.T. Gibson, Esso Resources Canada Limited, 1978.	18.00	48.00
172-3	WAVE CLIMATE STUDY OF SOUTHERN DAVIS STRAIT T.E. Keliher and T.T. Gibson, Esso Resources Canada Limited, 1978.	6.00	24.00
172-4	COMPARISON OF "ASIAK" BUOY DATA TO DATA EXTRACTED FROM SYNOPTIC WEATHER MAPS T.E. Keliher and A.G. Earle, Esso Resources Canada Limited, 1979.	6.00	8.50
172-5	COMPARISON OF METEOROLOGICAL DATA FROM BREVOORT AND THE "ASIAK" BUOY T.E. Keliher and A.G. Earle, Esso Resources Canada Limited, 1979.	6.00	5.00
182-1	BEAUFORT SEA COAST VIDEOTAPE MANUAL Woodward-Clyde Consultants, 1982	6.00	23.50
180-1	ATTACHMENT 2 ON MEASURING LARGE SCALE ICE FORCES: HANS ISLAND 1980 M. Metge, B. Danielewicz, and R. Hoare, Dome Petroleum Limited, 1981	6.00	7.00
192-1	AMUNDSEN GULF VIDEOTAPE MANUAL Woodward-Clyde Consultants, 1980	12.00	36.00
193-1	NORTHWEST PASSAGE VIDEOTAPE MANUAL Woodward-Clyde Consultants, 1980	12.00	45.50
196-1	ANALYSIS OF ACCIDENTS IN OFFSHORE OPERATIONS WHERE HYDROCARBONS WERE LOST W.P. Warlick, R.J. goodwin, P. Teymourian, W.F. Krieger, Houston Technical Services Center, Gulf Research and Development Company, c.a. 1982	42.00	75.00

APPENDIX 'L'

PEMD REGIONAL OFFICE INFORMATION

REGIONAL OFFICES

Newfoundland and Labrador
Parsons Building
90 O'Leary Avenue
P.O. Box 8950
St. John's, Newfoundland
A1B 3R9
Tel: (709) 772-4866
Telex: 016-4626

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Dartmouth, Nova Scotia
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Telex: 019-22525

New Brunswick
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770 Main Street
P.O. Box 1210
Moncton, New Brunswick
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Tel: (506) 388-6411
Telex: 014-2200

Prince Edward Island
134 Kent Street, Suite 400
Confederation Court Mall
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Prince Edward Island
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Telex: 014-44129

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37ᵉ étage
Case postale 247
Montréal (Québec)
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Telex: 055-60768

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Edmonton (Alberta)
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Télex: 037-2762

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Bentall Centre, Tower III,
Pièce 2743
595, rue Burrard
C.P. 49178
Vancouver (Colombie-Britannique)
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Tél.: (604) 666-1434
Télex: 045-1191

APPENDIX 'M'

TARIFF SCHEDULES OF THE UNITED STATES (TSUS)

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
A	652.75	00	Sign-plates, name-plates, numbers, letters, and other signs, all the foregoing of base metal	X	5.2% ad val.	3.8% ad val.	45% ad val.
	652.76	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	X	Free		
A	652.80	00	Expanded metal, of base metal	Sq. ft.v Lb.	5.2% ad val.	3.8% ad val.	45% ad val.
			Springs and leaves for springs, of base metal:				
A*	652.84	00	Suitable for motor-vehicle suspension	X	4% ad val.		25% ad val.
	652.85	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	X	Free		
A	652.86	00	Hairsprings	X	4% ad val.	3.7% ad val.	65% ad val.
	652.87	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	X	Free		
A	652.88	00	Other	X	6.7% ad val.	5.7% ad val.	45% ad val.
	652.89	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	X	Free		
			Hangars and other buildings, bridges, bridge sections, lock-gates, towers, lattice masts, roofs, roofing frameworks, door and window frames, shutters, balustrades, columns, pillars, and posts, and other structures and parts of structures, all the foregoing of base metal:				
			Of iron or steel:				
			Door and window frames:				
A	652.90	00	Of stainless steel	Lb.	4.7% ad val.	3.4% ad val.	35% ad val.
A	652.92	00	Other	Lb.	3.3% ad val.	2.4% ad val.	25% ad val.
			Columns, pillars, posts, beams, girders, and similar structural units:				
			Not in part of alloy iron or steel:				
A	652.93	00	Cast-iron (except malleable cast-iron) articles, rough or advanced	Lb.	1.4% ad val.		10% ad val.
	652.94	00	Other	Lb.	3% ad val.	2.8% ad val.	20% ad val.
			In part of alloy iron or steel:				
	652.95	00	In part of stainless steel	Lb.	4.7% ad val.	4.2% ad val.	30% ad val.
	652.96	00	Other	Lb.	4.3% ad val.	3.9% ad val.	28% ad val.
	652.97	00	Offshore oil and natural gas drilling and production platforms and parts thereof	Lb.	6.7% ad val.	5.7% ad val.	45% ad val.
A	653.00	00	Other	Lb.	6.7% ad val.	5.7% ad val.	45% ad val.
A	653.01		Other		6.7% ad val.	5.7% ad val.	45% ad val.
		10	Mobile homes	No.			
		20	Other	Lb.			
			Fence or sign posts of iron or steel:				
	653.02	00	Not of alloy iron or steel	Lb.	Free		20% ad val.
A	653.03	00	Of alloy iron or steel	Lb.	5.5% ad val.		28% ad val.

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

G S P	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2

PART 4. - MACHINERY AND MECHANICAL EQUIPMENT

Part 4 headnotes:

1. This part does not cover --
   (i) bobbins, spools, cops, tubes, and similar holders;
   (ii) belts and belting;
   (iii) machine clothing, other than card clothing provided for in items 670.52 and 670.54;
   (iv) articles of textile materials; articles of stone, of ceramic ware, of glass, or of other materials provided for in schedule 5; or articles of leather or of fur on the skin; or
   (v) articles and parts of articles specifically provided for elsewhere in the schedules.

2. Unless the context requires otherwise, and subject to headnote 1 to subpart A of this part, a multi-purpose machine is classifiable according to its principal purpose, but if such a machine is not described in a superior tariff heading as to its principal purpose, or if it has no one principal purpose, it is classifiable in subpart H of this part as a machine not specially provided for.

3. An electric motor or other power unit imported with a machine is classifiable with such machine as an entirety if fitted thereto when imported, or, if the machine or its framework is designed to receive the power unit, or if the shipment includes a common base designed to receive both the power unit and the machine.

Subpart A. - Boilers, Non-Electric Motors and Engines, and Other General-Purpose Machinery

Subpart A headnote:

1. A machine or appliance which is described in this subpart and also is described elsewhere in this part is classifiable in this subpart.

SCHEDULE 6. - METALS AND METAL PRODUCTS
Part 4. - Machinery and Mechanical Equipment

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
A	660.10		Steam and other vapor generating boilers (except central heating hot water boilers capable also of producing low pressure steam), and parts thereof		6.5% ad val.		45% ad val.
			Boilers:				
		10	Water tube stationary steam generating boilers	Ton			
		20	Other	Ton			
			Parts:				
		30	Heat exchangers	Ton			
		40	Other	Ton			
A	660.15		Economizers, superheaters, soot removers, gas recoverers, and auxiliary plants for use with steam and other vapor generating boilers; condensers for vapor engines and power units; all of the foregoing and parts thereof		7% ad val.		45% ad val.
		10	Condensers	Ton			
		20	Other	Ton			
			Producer gas and water gas generators, with or without purifiers; acetylene gas generators (water process) and other gas generators, with or without purifiers; all the foregoing and parts thereof:				
A	660.20	00	Apparatus for the generation of acetylene gas from calcium carbide, and parts thereof	X	3.3% ad val.	3.1% ad val.	20% ad val.
A	660.22	00	Other	X	3.9% ad val.	2.8% ad val.	45% ad val.
			Steam engines, steam turbines, and other vapor power units, and parts thereof:				
A	660.25	00	Steam engines and parts thereof	X	4% ad val.		15% ad val.
A	660.30		Steam turbines and parts thereof		7.5% ad val.		20% ad val.
		20	Steam turbines	No.			
		40	Parts	X			
A	660.35	00	Other	X	4.5% ad val.		27.5% ad val.
			Internal combustion engines and parts thereof:				
			Piston-type engines:				
	660.40		To be installed in tractors of a type provided for in item 692.34 or in agricultural or horticultural machinery or implements provided for in item 666.00		Free		Free
			Compression-ignition engines:				
		04	50 horsepower and under	No.			
		06	Over 50 horsepower	No.			
			Other:				
		08	50 horsepower and under	No.			
			Over 50 horsepower:				
		10	Air cooled	No.			
		12	Other	No.			
			Other:				
A*	660.42		Compression-ignition engines		4% ad val.	3.7% ad val.	35% ad val.
		20	For automobiles (including trucks and buses)	No.			
			Other:				
			For marine craft:				
		42	150 horsepower and under	No.			
		44	Over 150 but not over 300 horsepower	No.			
		46	Over 300 horsepower	No.			
		60	Other	No.			
	660.43	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	No.	Free		

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

SCHEDULE 6. - METALS AND METAL PRODUCTS
Part 4. - Machinery and Mechanical Equipment

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
			Internal combustion engines and parts thereof (con.):				
			Piston-type engines (con.):				
			Other (con.):				
			Engines other than compression-ignition engines:				
			Specially designed for:				
A*	660.48		Automobiles (including trucks and buses)..............	....	3.3% ad val.	3.1% ad val.	35% ad val.
		10	Used or rebuilt...........	No.			
		50	Other......................	No.			
	660.49	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)......	No......	Free		
A	660.56		Other..........................	....	1% ad val.	Free	35% ad val.
		10	Specially designed for aircraft..................	No.			
			Outboard motors for marine craft:				
		22	Under 30 horsepower................	No.			
		24	30 horsepower and over.................	No.			
			Other:				
		35	Under 1 horsepower................	No.			
		40	1 to 25 horsepower................	No.			
		45	Over 25 horsepower................	No.			
	660.57	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)......	No......	Free		
	660.58	00	If certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)..............	No......	Free		35% ad val.
			Non-piston type engines:				
A	660.59		Aircraft engines.............................	....	5% ad val.		35% ad val.
		20	Turbo-jet and gas turbine, new...........	No.			
		40	Other....................................	No.			
	660.61	00	If certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)....	No......	Free		35% ad val.
A	660.62		Other...	....	5% ad val.		35% ad val.
		10	Gas turbines.............................	No.			
		80	Other....................................	No.			
	660.63	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).....................	No......	Free		
			Parts:				
	660.64	00	Cast-iron (except malleable cast-iron) parts, not alloyed and not advanced beyond cleaning, and machined only for the removal of fins, gates, sprues, and risers or to permit location in finishing machinery...........	Lb......	Free		10% ad val.

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
			Internal combustion engines and parts thereof (con.):				
			Parts (con.):				
			Other parts:				
A	660.67		Parts of piston-type engines other than compression-ignition engines........	....	3.3% ad val.	3.1% ad val.	35% ad val.
			Parts of automobile engines (including truck and bus engines):				
		07	Connecting rods................	No. v Lb.			
		13	Crankshafts....................	No. v Lb.			
		18	Other..........................	X			
			Parts of marine craft engines:				
		23	Connecting rods................	No. v Lb.			
		27	Crankshafts................ ...	No. v Lb.			
		32	Other..........................	X			
			Other:				
		43	Connecting rods................	No. v Lb.			
		47	Crankshafts....................	No. v Lb.			
		52	Other..........................	X			
	660.68	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)....	X.......	Free		
	660.69	00	If certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)................	X.......	Free		35% ad val.
A	660.71		Other.....................................	....	4% ad val.	3.7% ad val.	35% ad val.
			Parts of compression-ignition piston-type engines:				
			Parts of automobile engines (including truck and bus engines):				
		07	Connecting rods...........	No. v Lb.			
		13	Crankshafts...............	No. v Lb.			
		18	Other.....................	X			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
			Internal combustion engines and parts thereof (con.):				
			Parts (con.):				
			Other parts (con.):				
A	660.71 (con.)		Other (con.):				
			Parts of compression-ignition piston-type engines (con.):				
			Parts of marine craft engines:				
		23	Connecting rods...........	No. v Lb.			
		27	Crankshafts...............	No. v Lb.			
		32	Other.....................	X			
			Other:				
		43	Connecting rods...........	No. v Lb.			
		47	Crankshafts...............	No. v Lb.			
		50	Other.....................	X			
			Parts of non-piston type engines:				
		60	Parts of aircraft engines......	X			
		65	Parts of non-aircraft gas turbine engines...............	X			
		70	Other..........................	X			
	660.72	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)....	X.......	Free		
	660.73	00	If certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)................	X.......	Free		35% ad val.
			Water wheels, water turbines, and other water engines, and parts including governors therefor:				
A	660.74	00	Governors..	No......	$1.12 each + 17.5% ad val.		68.5% ad val.
A	660.76		Other..	....	7.5% ad val.		27.5% ad val.
		20	Water wheels, water turbines, and other water engines..............................	No.			
		40	Parts..	X			
			Non-electric engines and motors not specially provided for, and parts thereof:				
A	660.77	00	Hydrojet engines for motor boats, and parts thereof...	X.......	2.4% ad val.		30% ad val.
A	660.80	00	Spring-operated and weight-operated motors.........	No......	5.5% ad val.	4% ad val.	35% ad val.
A	660.85		Other..	....	3.7% ad val.	3.4% ad val.	27.5% ad val.
		10	Linear hydraulic motors (hydraulic cylinders) and parts thereof.................	X			
		20	Other..	X			
	660.86	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B schedule 6)...........................	X.......	Free		
	660.87	00	Non-electric engines and motors, if certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)..............	X.......	Free		27.5% ad val.

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

SCHEDULE 6. - METALS AND METAL PRODUCTS
Part 4. - Machinery and Mechanical Equipment

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
			Pumps for liquids, whether or not fitted with measuring devices; liquid elevators of bucket, chain, screw, hand, and similar types; all the foregoing whether operated by hand or by any kind of power unit, and parts thereof:				
A	660.92	00	Fuel injection pumps for compression-ignition engines, and parts thereof..........................	X.......	2.6% ad val.	2.5% ad val.	35% ad val.
	660.93	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)..........................	X.......	Free		
A	660.96	00	Stock pumps, and parts thereof, imported for use with machines for making cellulosic pulp, paper, or paperboard......................................	X.......	0.9% ad val.	Free	35% ad val.
A	660.97		Other...	....	3.5% ad val.	3% ad val.	35% ad val.
		02	Motor-vehicle pumps..............................	No.			
		05	Measuring and dispensing pumps................	No.			
		10	Hydraulic fluid power pumps....................	No.			
			Other:				
		25	Reciprocating pumps........................	No.			
			Centrifugal pumps:				
		35	Single-stage, single-suction, close-coupled.......................	No.			
		45	Single-stage, single-suction, frame-mounted.......................	No.			
		50	Single-stage, double-suction........	No.			
		52	Multistage, single- or double-suction.............................	No.			
		54	Other...............................	No.			
		56	Other, except parts.......................	No.			
		60	Parts.....................................	X			
	660.98	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)....................................	X.......	Free		
	660.99	00	Pumps for liquids, operated by any kind of power unit, if certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)...	X.......	Free		35% ad val.
			Air pumps, vacuum pumps and air or gas compressors (including free-piston compressors for gas turbines); fans and blowers; all the foregoing, whether operated by hand or by any kind of power unit, and parts thereof:				
			Fans and blowers, and parts thereof:				
A	661.05	00	Blowers for pipe organs.......................	No......	1.3% ad val.	Free	35% ad val.
A*	661.06		Other...	....	5.3% ad val.	4.7% ad val.	35% ad val.
		10	Electric fans, other than for permanent installation..................	No.			
		20	Fans and blowers suitable for use with motor vehicles...........................	No.			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
			Centrifuges; filtering and purifying machinery and apparatus (other than filter funnels, milk strainers, and similar articles), for liquids or gases; all the foregoing and parts thereof (con.):				
			Other:				
A	661.92	00	Cast-iron (except malleable cast-iron) parts, not alloyed and not advanced beyond cleaning, and machined only for the removal of fins, gates, sprues, and risers or to permit location in finishing machinery..........	Lb......	0.4% ad val.	Free	10% ad val.
	661.93	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).........	Lb......	Free		
A*	661.94	00	Portable air purifiers, not specially designed for industrial use, and filters therefor.......................................	X.......	4.3% ad val.	3.9% ad val.	35% ad val.
A	661.95		Other..	....	4.3% ad val.	3.9% ad val.	35% ad val.
		20	Ion-exchange resins......................	Lb.			
		80	Other....................................	X			
	661.96	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).........	X.......	Free		
	661.97	00	Filtering and purifying machinery and apparatus, if certified for use in civil aircraft (see headnote 3, part 6C, schedule 6)..........................	X.......	Free		35% ad val.
			Machinery for cleaning or drying bottles or other containers; machinery for filling, closing, sealing, capsuling, or labelling bottles, cans, boxes, bags, or other containers; other packing or wrapping machinery; machinery for aerating beverages; dish washing machines; all the foregoing and parts thereof:				
A	662.10		Machines for packaging pipe tobacco; machines for wrapping candy; machines for wrapping cigarette packages; and combination candy cutting and wrapping machines; all the foregoing and parts thereof..	....	3.8% ad val.	3.4% ad val.	35% ad val.
		20	Machines for wrapping candy....................	No.			
		40	Other machines.................................	No.			
		60	Parts of the foregoing.........................	X			
A	662.15	00	Can-sealing machines, and parts thereof............	X.......	5.[illegible]% ad val.	4.5% ad val.	30% ad val.
			Other:				
A	662.18	00	Cast-iron (except malleable cast-iron) parts, not alloyed and not advanced beyond cleaning, and machined only for the removal of fins, gates, sprues, and risers, or to permit location in finishing machinery...........................	X.......	1.4% ad val.	1.3% ad val.	10% ad val.
A	662.20		Other..	....	4.1% ad val.	3.6% ad val.	35% ad val.
			Strapping machines and parts thereof:				
		30	Machines.............................	No.			
		35	Parts................................	X			
			Other wrapping and packaging machines and parts thereof:				
		45	Machines.............................	No.			
		50	Parts................................	X			
		65	Other....................................	X			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
			Subpart B. - Elevators, Winches, Cranes, and Related Machinery; Earth-Moving and Mining Machinery				
			Subpart B headnote:				
			1. This subpart does not cover -- (i) cranes or other machines mounted on vehicles, on vessels or other floating structures, or on other transport equipment (see part 6 of this schedule); or (ii) agricultural implements (see subpart C of this part).				
			Mechanical shovels, coal-cutters, excavators, scrapers, bulldozers, and other excavating, levelling, boring, and extracting machinery, all the foregoing, whether stationary or mobile, for earth, minerals, or ores; pile drivers; snow plows, not self-propelled; all the foregoing and parts thereof:				
A	664.06	00	Peat excavators	No.	1.3% ad val.	Free	35% ad val.
A	664.07		Backhoes, shovels, clamshells, draglines, and wheel-type front-end loaders		2.8% ad val.	2% ad val.	35% ad val.
		10	Backhoes, shovels, clamshells and draglines	No.			
		20	Wheel-type front-end loaders	No.			
A	664.08		Other		3.1% ad val.	2.5% ad val.	35% ad val.
		05	Rock breaking machines	No.			
		08	Drilling or boring machines	No.			
		20	Tracklaying-type front-end loaders	No.			
		30	Other machines	No.			
			Parts (including parts for articles provided for in items 664.06 and 664.07):				
		35	Track links	Lb.			
		42	Other	X			
A*	664.10		Elevators, hoists, winches, cranes, jacks, pulley tackle, belt conveyors, and other lifting, handling, loading, or unloading machinery, and conveyors, all the foregoing and parts thereof not provided for in item 664.06, 664.07, or 664.08		2.8% ad val.	2% ad val.	35% ad val.
		05	Industrial robots	No.			
			Other:				
		15	Elevators, including freight, and moving stairways	No.			
			Conveyors:				
		25	Belt	No.			
		31	Other	No.			
		44	Hoists	No.			
		55	Overhead traveling cranes	No.			
			Jacks:				
		56	Hydraulic	No.			
		57	Other	No.			
		59	Winches	No.			
		60	Other, except parts	No.			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

Subpart H. - Other Machines

Subpart H statistical headnotes:

1. For statistical reporting purposes in this subpart (item 678.50), "audio tape players" are those machines designed specifically for reproducing frequencies in the sound spectrum only.

2. For statistical reporting purposes in this subpart, "stereo" apparatus will be considered to be capable of reproducing two (and no more) discrete audio signals.

GSP	Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
	678.10	00	Shoe machinery and parts thereof........................	X.......	Free		Free
A	678.20		Machinery for sorting, screening, separating, washing, crushing, grinding, or mixing earth, stone, ores, or other mineral substances in solid (including powder or paste) form; machinery for agglomerating, molding, or shaping solid mineral fuels, ceramic paste, unhardened cements, plastering materials or other mineral products in powder or paste form; machines for forming foundry molds of sand; all the foregoing and parts thereof..	....	3.4% ad val.	2.9% ad val.	35% ad val.
		10	Machinery for sorting, screening, separating, washing, crushing, grinding, or mixing earth, stone, ores, or other mineral substances in solid (including powder or paste) form.............	No.			
		20	Parts of the foregoing.............................	X			
			Other:				
		30	Designed for use with ceramic paste, unhardened cements, and plastering materials........	No.			
		40	Machines for forming foundry molds of sand....	No.			
		50	Other machinery................................	No.			
		60	Parts..	X			
			Glass-working machines (other than machines for working glass in the cold); machines for assembling electric filament and discharge lamps and electronic tubes; all the foregoing and parts thereof:				
A	678.30		Glass-working machines and parts thereof...........	....	4.3% ad val.	3.9% ad val.	35% ad val.
		20	Machines..	No.			
		40	Parts..	X			
A	678.32		Other..	....	4% ad val.	3.7% ad val.	35% ad val.
		20	Machines..	No.			
		40	Parts..	X			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

G S P	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
					1	LDDC	2
			Molds of types used for metal (except ingot molds), for metallic carbides, for glass, for mineral materials, or for rubber or plastics materials (con.):				
A	680.13		Other		4.3% ad val.	3.9% ad val.	35% ad val.
		05	Injection, including die cast dies	No.			
		10	Compression (compaction)	No.			
		15	Blow	No.			
		20	Gravity pour (permanent)	No.			
		25	Other	No.			
			Taps, cocks, valves, and similar devices, however operated, used to control the flow of liquids, gases, or solids, all the foregoing and parts thereof:				
			Hand-operated and check, and parts thereof:				
A	680.14		Of copper		6.5% ad val.	5.6% ad val.	47% ad val.
		10	Under 125 pounds working pressure	Lb.			
			125 pounds working pressure and over:	Lb.			
		20	Check	Lb.			
		30	Gate	Lb.			
		40	Globe	Lb.			
		50	Plug	Lb.			
		60	Ball	Lb.			
		70	Butterfly	Lb.			
		80	Other	Lb.			
	680.16	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	Lb.	Free		
A	680.17		Of iron or steel		9% ad val.	8% ad val.	45% ad val.
			Of iron or steel containing over 2.5 percent carbon by weight:				
		05	Check	Lb.			
		10	Gate	Lb.			
		15	Globe	Lb.			
		18	Plug	Lb.			
		25	Ball	Lb.			
		30	Butterfly	Lb.			
		35	Other	Lb.			
			Other:				
		42	Check	Lb.			
		45	Gate	Lb.			
		50	Globe	Lb.			
		55	Plug	Lb.			
		60	Ball	Lb.			
		65	Butterfly	Lb.			
		68	Other	Lb.			
	680.18	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	Lb.	Free		
A	680.19	00	Other	Lb.	6.1% ad val.	4.4% ad val.	45% ad val.
	680.24	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)	Lb.	Free		

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
			Taps, cocks, valves, and similar devices, however operated, used to control the flow of liquids, gases, or solids, all the foregoing and parts thereof (con.):				
			Other:				
A	680.25	00	Ballcock mechanisms, and parts................	X.......	4.3% ad val.	3.9% ad val.	35% ad val.
A	680.27		Other..	....	4% ad val.	3.7% ad val.	35% ad val.
		20	Safety and relief valves.................	No.			
		40	Other....................................	X			
	680.28	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).........	X.......	Free		
	680.30		Antifriction balls and rollers...........................	....	5.5% ad val.	4.9% ad val.	45% ad val.
			Balls:				
		25	Alloy steel..................................	Lb.			
		30	Other..	Lb.			
		40	Rollers..	Lb.			
	680.31	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6)....	Lb......	Free		
			Ball or roller bearings, including such bearings with integral shafts, and parts thereof:				
	680.33	00	Ball bearings with integral shafts................	No......	4.7% ad val.	4.2% ad val.	35% ad val.
	680.34	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).........................	No......	Free		
			Other:				
	680.37[1]		Ball bearings, and parts thereof..............	....	11% ad val.		67% ad val.
			Radial ball bearings, having an outside diameter of:				
		04	Under 9 mm..........................	No.			
		08	9 mm and over but not over 30 mm....	No.			
		12	Over 30 mm but not over 52 mm.......	No.			
		17	Over 52 mm but not over 100 mm......	No.			
		18	Over 100 mm.........................	No.			
		22	Ball bearings, other than radial.........	No.			
			Parts of ball bearings (including parts of articles provided for in item 680.33):				
		27	Inner races and outer races (including inner and outer races of integral shaft bearings provided for in item 680.33).............................	No.			
		28	Other parts.........................	Lb.			
	680.38[1]		If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).........	....	Free		
			Ball bearings and parts:				
		20	Ball bearings..................	No.			
		30	Parts of ball bearings.........	Lb.			

---

[1] Articles exported to the United States prior to July 1, 1980, must be appraised under the valuation standards provided for in sections 402 and 402a of the Tariff Act of 1930 in effect on June 30, 1980, and are subject to classification under the items of the Tariff Schedules in effect on that date.

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

GSP	Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty 1	Rates of Duty LDDC	Rates of Duty 2
			Motor vehicles (except motorcycles) for the transport of persons or articles (con.):				
			Other (con.):				
	692.11 (con.)		If Canadian article, but not including any three-wheeled vehicle (see general headnote 3(d)) (con.):				
			On-the-highway, four-wheeled, passenger automobiles (con.):				
			New (con.):				
			Having piston-type engines (con.):				
		30	Over 6 cylinders..........	No.			
		35	Other..........................	No.			
		40	Used................................	No.			
		60	Vehicles which operate in whole or in part on runners or skis..................	No.			
		80	Other....................................	No.			
			Motor vehicles specially constructed and equipped to perform special services or functions, such as, but not limited to, fire engines, mobile cranes, wreckers, concrete mixers, and mobile clinics:				
A	692.14	00	Fire engines..	No......	6.1% ad val.	5.3% ad val.	25% ad val.
A	692.16		Other...	....	4% ad val.	3.7% ad val.	25% ad val.
		10	Mobile cranes.................................	No.			
		30	Other..	X			
			Chassis, bodies (including cabs), and parts of the foregoing motor vehicles:				
			Bodies (including cabs) and chassis:				
	692.20		For automobile trucks and motor buses.........	....	4% ad val.		25% ad val.
			Bodies (including cabs):				
		10	For automobile trucks except truck tractors......................	No.			
		20	For automobile truck tractors.......	No.			
		30	For motor buses.....................	No.			

Note: For explanation of the symbol "A" or "A*" in the column entitled "GSP", see general headnote 3(c).

APPENDIX 'N'

ALASKA TELECOM, INC. - OIL PATCH COMMUNCIATIONS, PRUDHOE BAY

Alaska Telecom, Inc.

Prudhoe Communications, Inc.

Oil Patch Communications

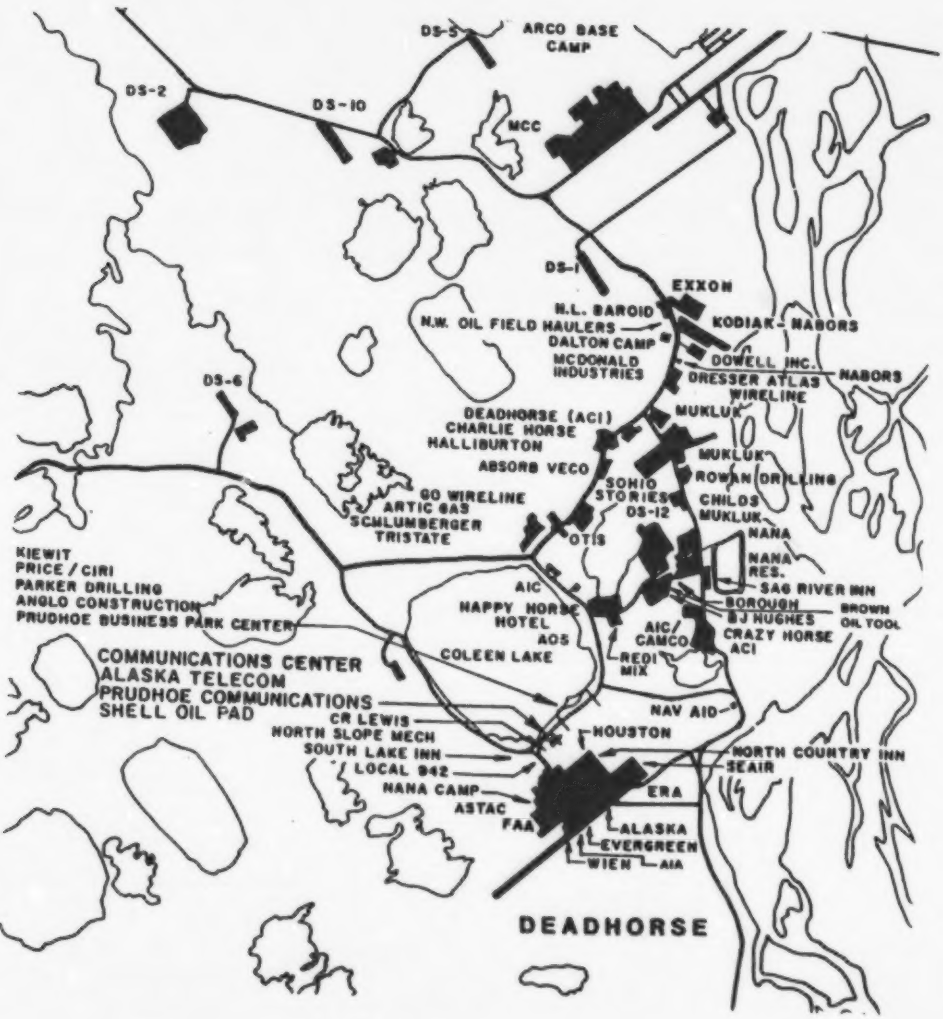
- Radio Paging - "BEEPERS"
- Car Telephones
- Hand Held Telephones
- Telephone Links to Remote Locations - (DRT Sets)
- Communications Equipment Lease/Rental
- Communications System Design
- Communications Centers - Locate your radio system at our communications sites for extended range communications coverage.

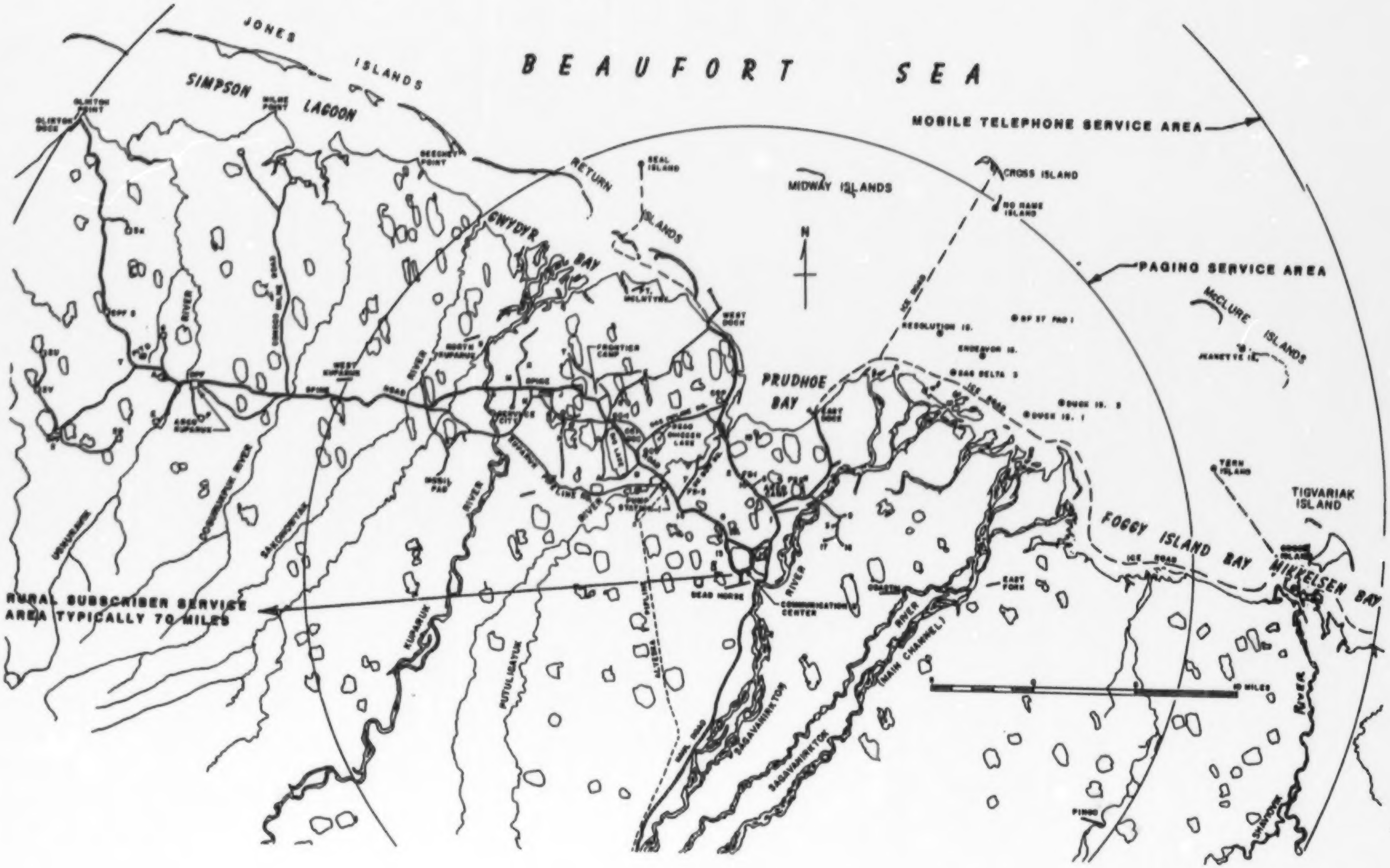
For information contact:

Alaska Telecom, Inc.

1103 C St.
Anchorage, Alaska 99501
907-277-5325

Communications Center
Deadhorse, Alaska
907-659-3100


DS-5
ARCO BASE CAMP
DS-2
DS-10
MCC
DS-1
EXXON
H.L. BAROID
N.W. OIL FIELD HAULERS
KODIAK-NABORS
DALTON CAMP
MCDONALD INDUSTRIES
DOWELL INC.
NABORS
DRESSER ATLAS WIRELINE
DS-6
DEADHORSE (ACI)
CHARLIE HORSE
HALLIBURTON
MUKLUK
MUKLUK
ABSORB VECO
ROWAN DRILLING
SOHIO STORIES
GO WIRELINE
ARTIC GAS
SCHLUMBERGER
TRISTATE
CHILDS
DS-12
MUKLUK
NANA
OTIS
NANA RES.
KIEWIT
PRICE / CIRI
PARKER DRILLING
ANGLO CONSTRUCTION
PRUDHOE BUSINESS PARK CENTER
AIC
SAG RIVER INN
HAPPY HORSE HOTEL
BOROUGH
BROWN OIL TOOL
BJ HUGHES
AOS
AIC/CAMCO
CRAZY HORSE ACI
COLEEN LAKE
REDI MIX
COMMUNICATIONS CENTER
ALASKA TELECOM
PRUDHOE COMMUNICATIONS
SHELL OIL PAD
NAV AID
CR LEWIS
NORTH SLOPE MECH
HOUSTON
SOUTH LAKE INN
NORTH COUNTRY INN
SEAIR
LOCAL 942
NANA CAMP
ERA
ASTAC
FAA
ALASKA
EVERGREEN
WIEN
AIA
DEADHORSE


BEAUFORT SEA
JONES ISLANDS
SIMPSON LAGOON
OLIKTOK POINT
OLIKTOK DOCK
MILNE POINT
BEECHEY POINT
RETURN ISLANDS
SEAL ISLAND
GWYDYR BAY
MIDWAY ISLANDS
N
MOBILE TELEPHONE SERVICE AREA
CROSS ISLAND
NO NAME ISLAND
PAGING SERVICE AREA
McCLURE ISLANDS
JEANETTE IS.
ICE ROAD
RESOLUTION IS.
ENDEAVOR IS.
DF 37 PAD 1
SAG DELTA 3
DUCK IS. 2
DUCK IS. 1
PT. McINTYRE
WEST DOCK
FRONTIER CAMP
NORTH KUPARUK
WEST KUPARUK
ARCO KUPARUK
SPINE ROAD
RIVER
DEADHORSE CITY
PIPELINE
PRUDHOE BAY
EAST DOCK
GAS LAKE
DEAD CHICKEN LAKE
PUMP STATION
MOBIL PAD
DEAD HORSE
COMMUNICATION CENTER
RIVER
EAST FORK
FOGGY ISLAND BAY
ICE ROAD
TERN ISLAND
TIGVARIAK ISLAND
MIKKELSEN BAY
RIVER
(MAIN CHANNEL)
SAGAVANIRKTOK
KUPARUK
PUTULIGAYUK
SAKONOWYAK
UGNURAVIK
10 MILES
RURAL SUBSCRIBER SERVICE AREA TYPICALLY 70 MILES

APPENDIX 'O'

EXTRACTS FROM FINAL SUPPLEMENT TO FINAL E.I.S. - PROPOSED FIVE YEAR OCS, OIL & GAS LEASE SALES SCHEDULE JAN. 1982 - DEC. 1986

ALASKA OCS OIL AND GAS DEVELOPMENT ESTIMATED TO RESULT FROM THE IMPLEMENTATION OF THE FINAL 1982-86 OIL AND GAS LEASING SCHEDULE

Planning Area	Oil/billion bbls**	Gas Tcf**	Probability of Economic Success
S. Alaska (Kodiak, Schumagin, Gulf of Alaska, Cook Inlet)	.1	.8	1.00
St. George Basin	.4	2.2	.64
Navarin Basin	.6	3.7	.76
Norton Basin	.2	1.6	.57
Barrow Arch	.3	1.0	.76
Diapir Field	1.7	8.9	1.00
N. Aleutian Basin	.3	1.3	.42
Hope Basin	.1	.8	.24

**Conditional mean estimates of resources to be recovered from adoption of the proposed Department of Interior leasing schedule (Alternative I-1). This alternative most closely approximates the final 1982-87 five-year OCS oil and gas leasing schedule according to the Minerals Management Service, Los Angeles (June 1983 personal communication).

Source: Final supplement to the Final Environmental Statement - Proposed Five-Year OCS Oil and Gas Lease Sale Schedule, Jan. 1982-Dec. 1986, Vol. 1, pg. 41-43.

DIFFERENCES IN ALASKA OCS RESOURCE ESTIMATES CONTAINED IN THE 1982-86 LEASE SCHEDULE EIS AND SUBSEQUENT INDIVIDUAL LEASE SALE EISS

Planning Area/Sale No. (Area)	Resource Estimates Oil/billion bbls	Gas/Tcf
Diapir Field*	1.7	8.9
71 (Diapir Field)** 9/82	2.38	1.78
Norton Sound*	.2	1.6
57 (Norton Sound)** 3/83	.14	1.09
St. George Basin*	.4	2.2
70 (St. George Basin)** 2/83	1.12	3.66

*Estimates taken from Final Supplement to the Final Environmental Statement - Proposed Five-Year OCS Oil and Gas Lease Schedule, Jan. 1982-Dec. 1986, Vol. 1, pg. 41-43 (March 1982)

**Estimates taken from EISs prepared for individul lease sales.

ESTIMATED ALASKA OCS PLATFORM DEVELOPMENT TO RESULT FROM THE IMPLEMENTATION OF THE FINAL 1982-87 OIL AND GAS LEASING SCHEDULE

Planning Area	Number of Platforms	Platforms First	Most Intense	Last
S. Alaska (Kodiak, Schumagin, Gulf of Alaska, Cook Inlet)	1	1991	1991	1991
St. George Basin	3	1987	1987-91	1991
Navarin Basin	3	1988	1988	1995
Norton Basin	3	1988	1988	1993
Barrow Arch*	1	1990	1990	1990
Diapir Field*	8	1986	1989-90	1998
N. Aleutian Basin	2	1987	1987	1991
Hope Basin*	1	1990	1990	1990

*Includes only the portion of the planning area in water depths of 0-100 meters (328 ft).

**Conditional mean estimates of resources to be recovered from adoption of the proposed Department of Interior schedule (Alternative I-1). This alternative most closely approximates the final 1982-87 five-year OCS oil and gas leasing schedule according to the Minerals Management Service, Los Angeles (June 1983 personal communication).

Source: Final Supplement to the Final Environmental Statement - Proposed Five-Year OCS Oil and Gas Lease Sale Schedule, Jan. 1982-Dec., 1986, Vol. 1, pg. 41-43.

PLATFORM PROJECTION NUMBERS FROM FINAL EIS'S PREPARED FOR ALASKA OCS LEASE SALES HELD BETWEEN 1976 AND 1983

Sale No./Area/Date	Projected No. of Production Platforms
39 (N. Gulf of Alaska) 1976[a]	22[b]
CI (Cook Inlet) 1977[a]	25[b]
BF (Beaufort) 1979	3-6[c]
55 (E. Gulf of Alaska) 1980	2[c]
60 (Lower Cook Inlet/ Shelikot Strait) 1981	4[c]
71 (Diapir Field) 1982	3[c]
57 (Norton Sound) 1983	9[c]
70 (St. George) 1983	11[c]

a. No discoveries to date (1983).

b. Projections based on extreme range for estimated recoverable oil and gas resources.

c. Projections based on estimated mean range of undiscovered recoverable oil and gas resources.

Source: Final EIS for the pertinent area.

APPENDIX 'P'

ALASKA DRILLING STATISTICS FOR MARCH 1985

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                                      ALASKA DRILLING STATISTICS FOR MARCH, 1985
* DRILLING PERMITS APPROVED * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 API NUMBER        OPERATOR NAME
   PERMIT NUMBER     SURFACE LOCATION                          WELL NAME AND NUMBER                 CLASSIFICATION
     PERMIT APPROVED   BOTTOM HOLE OBJECTIVE                                                          GEOLOGIC AREA
                                                                                                        FIELD AND POOL

50-029-21292-00  ARCO ALASKA INC                              PRUDHOE BAY UNIT    DS9-28        DEVELOPMENT
   85-0029          182FT FNL AND  623FT FEL, SEC 11, T10N, R015E, UM.                            ARCTIC SLOPE
     03/05/85         2653FT FSL AND 2333FT FWL, SEC 03, T10N, R015E, UM.                           PRUDHOE BAY, PRUDHOE OIL POOL

50-029-21293-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2V-13        DEVELOPMENT
   85-0030          1163FT FSL AND  173FT FEL, SEC 07, T11N, R009E, UM.                           ARCTIC SLOPE
     03/05/85         1053FT FSL AND 1283FT FEL, SEC 18, T11N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21294-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2V-14        DEVELOPMENT
   85-0031          1223FT FSL AND  173FT FEL, SEC 07, T11N, R009E, UM.                           ARCTIC SLOPE
     03/05/85         1518FT FNL AND 1310FT FEL, SEC 18, T11N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21295-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2V-15        DEVELOPMENT
   85-0032          1283FT FSL AND  172FT FEL, SEC 07, T11N, R009E, UM.                           ARCTIC SLOPE
     03/05/85         1327FT FSL AND 1431FT FEL, SEC 07, T11N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21296-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2V-16        DEVELOPMENT
   85-0033          1343FT FSL AND  171FT FEL, SEC 07, T11N, R009E, UM.                           ARCTIC SLOPE
     03/05/85         1117FT FNL AND 1310FT FEL, SEC 07, T11N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21297-00  CONOCO INC                                   MILNE POINT UNIT     B-9          DEVELOPMENT
   85-0034          348FT FSL AND  819FT FWL, SEC 18, T13N, R011E, UM.                            ARCTIC SLOPE
     03/01/85         3202FT FNL AND 4670FT FEL, SEC 24, T13N, R010E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21298-00  ARCO ALASKA INC                              PRUDHOE BAY UNIT     L2-28        DEVELOPMENT
   85-0035          1967FT FSL AND 1188FT FWL, SEC 18, T11N, R015E, UM.                           ARCTIC SLOPE
     03/05/85         1650FT FSL AND 1681FT FWL, SEC 08, T11N, R015E, UM.                           PRUDHOE BAY, LISBURNE OIL POOL

50-029-21299-00  CONOCO INC                                   MILNE POINT UNIT     C-9          SERVICE
   85-0036          4166FT FNL AND 2428FT FEL, SEC 10, T13N, R010E, UM.                           ARCTIC SLOPE
     03/08/85         2084FT FSL AND 1220FT FEL, SEC 04, T13N, R010E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21300-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2V-9         DEVELOPMENT
   85-0037          1343FT FSL AND  109FT FWL, SEC 08, T11N, R009E, UM.                           ARCTIC SLOPE
     03/07/85         1169FT FNL AND 1098FT FEL, SEC 08, T11N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21301-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2U-9         DEVELOPMENT
   85-0038          1196FT FSL AND  883FT FWL, SEC 32, T12N, R009E, UM.                           ARCTIC SLOPE
     03/11/85         1327FT FSL AND  536FT FWL, SEC 31, T12N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21302-00  ARCO ALASKA INC                              KUPARUK RIV UNIT     2U-10        DEVELOPMENT
   85-0039          1254FT FSL AND  897FT FWL, SEC 32, T12N, R009E, UM.                           ARCTIC SLOPE
     03/11/85         1329FT FSL AND 1497FT FEL, SEC 31, T12N, R009E, UM.                           KUPARUK RIVER, KUPARUK RIVER OIL POOL
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ALASKA DRILLING STATISTICS FOR MARCH, 1985

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* DRILLING PERMITS APPROVED * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

API NUMBER        OPERATOR NAME                      WELL NAME AND NUMBER             CLASSIFICATION
  PERMIT NUMBER     SURFACE LOCATION                                                     GEOLOGIC AREA
    PERMIT APPROVED   BOTTOM HOLE OBJECTIVE                                                FIELD AND POOL

50-029-21303-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    2U-11          DEVELOPMENT
  85-0040          1312FT FSL AND  912FT FWL, SEC 32, T12N, R009E, UM.                   ARCTIC SLOPE
    03/11/85         1180FT FNL AND  958FT FWL, SEC 31, T12N, R009E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOI

50-029-21304-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    2U-12          DEVELOPMENT
  85-0041          1370FT FSL AND  927FT FWL, SEC 32, T12N, R009E, UM.                   ARCTIC SLOPE
    03/11/85         1123FT FNL AND 1384FT FEL, SEC 31, T12N, R009E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOI

50-733-20376-00  AMOCO PRODUCTION CO                GRANITE PT ST 18742 35         DEVELOPMENT
  85-0042          779FT FNL AND  713FT FEL, SEC 12, T10N, R012W, SM.                    COOK INLET BASIN
    03/18/85         2068FT FNL AND 1116FT FWL, SEC 12, T10N, R012W, SM.                   GRANITE POINT, MIDDLE KENAI OIL POOL

50-029-21305-00  CONOCO INC                         MILNE POINT UNIT    B-11           DEVELOPMENT
  85-0043          464FT FSL AND  790FT FWL, SEC 18, T13N, R011E, UM.                    ARCTIC SLOPE
    03/13/85         3371FT FNL AND 2768FT FEL, SEC 13, T13N, R010E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21306-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    1Q-13          DEVELOPMENT
  85-0044          1066FT FNL AND 1952FT FEL, SEC 26, T12N, R009E, UM.                   ARCTIC SLOPE
    03/18/85         1554FT FSL AND 1123FT FWL, SEC 23, T12N, R009E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21307-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    1Q-14          DEVELOPMENT
  85-0045          1076FT FNL AND 1893FT FEL, SEC 26, T12N, R009E, UM.                   ARCTIC SLOPE
    03/19/85         987FT FNL AND 1183FT FWL, SEC 23, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21308-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    1Q-15          DEVELOPMENT
  85-0046          1087FT FNL AND 1834FT FEL, SEC 26, T12N, R009E, UM.                   ARCTIC SLOPE
    03/18/85         983FT FNL AND 1286FT FEL, SEC 23, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21309-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    1Q-16          DEVELOPMENT
  85-0047          1098FT FNL AND 1775FT FEL, SEC 26, T12N, R009E, UM.                   ARCTIC SLOPE
    03/18/85         893FT FSL AND 1242FT FEL, SEC 23, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21310-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    2V-10          DEVELOPMENT
  85-0048          1283FT FSL AND  109FT FWL, SEC 08, T11N, R009E, UM.                   ARCTIC SLOPE
    03/19/85         1322FT FSL AND 1082FT FEL, SEC 08, T11N, R009E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21311-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    2V-11          DEVELOPMENT
  85-0049          1223FT FSL AND  108FT FWL, SEC 08, T11N, R009E, UM.                   ARCTIC SLOPE
    03/19/85         1466FT FNL AND 1099FT FEL, SEC 17, T11N, R009E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

50-029-21312-00  ARCO ALASKA INC                    KUPARUK RIV UNIT    2V-12          DEVELOPMENT
  85-0050          1163FT FSL AND  107FT FWL, SEC 08, T11N, R009E, UM.                   ARCTIC SLOPE
    03/18/85         1061FT FSL AND 1125FT FEL, SEC 17, T11N, R009E, UM.                   KUPARUK RIVER, KUPARUK RIVER OIL POOL
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                              ALASKA DRILLING STATISTICS FOR MARCH, 1985

* DRILLING PERMITS APPROVED * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 API NUMBER        OPERATOR NAME                     WELL NAME AND NUMBER              CLASSIFICATION
   PERMIT NUMBER     SURFACE LOCATION                                                    GEOLOGIC AREA
     PERMIT APPROVED    BOTTOM HOLE OBJECTIVE                                              FIELD AND POOL

 50-029-21313-00  SOHIO ALASKA PETROLEUM CO        PRUDHOE BAY UNIT    A-35            DEVELOPMENT
   85-0051           1061FT FNL AND  920FT FEL, SEC 35, T11N, R013E, UM.                 ARCTIC SLOPE
     03/22/85            843FT FSL AND 1588FT FWL, SEC 25, T11N, R013E, UM.                PRUDHOE BAY, PRUDHOE OIL POOL

 50-029-21314-00  ARCO ALASKA INC                  PRUDHOE BAY UNIT    DS9-35          DEVELOPMENT
   85-0052           1822FT FSL AND 1048FT FEL, SEC 02, T10N, R015E, UM.                 ARCTIC SLOPE
     03/20/85            356FT FSL AND 2258FT FWL, SEC 35, T11N, R015E, UM.                PRUDHOE BAY, PRUDHOE OIL POOL

 50-029-21317-00  ARCO ALASKA INC                  PRUDHOE BAY UNIT    L1-1            DEVELOPMENT
   85-0055           2183FT FSL AND 2448FT FWL, SEC 01, T11N, R014E, UM.                 ARCTIC SLOPE
     03/27/85            634FT FSL AND 1195FT FWL, SEC 12, T11N, R014E, UM.                PRUDHOE BAY, LISBURNE OIL POOL

 50-029-21318-00  ARCO ALASKA INC                  KUPARUK RIV UNIT    3B-1            DEVELOPMENT
   85-0056            776FT FSL AND  852FT FEL, SEC 16, T12N, R009E, UM.                 ARCTIC SLOPE
     03/28/85            1523FT FSL AND 1191FT FWL, SEC 16, T12N, R009E, UM.               KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21319-00  ARCO ALASKA INC                  KUPARUK RIV UNIT    3B-2            DEVELOPMENT
   85-0057            836FT FSL AND  857FT FEL, SEC 16, T12N, R009E, UM.                 ARCTIC SLOPE
     03/28/85            1104FT FNL AND 1105FT FWL, SEC 16, T12N, R009E, UM.               KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21320-00  SOHIO ALASKA PETROLEUM CO        PRUDHOE BAY UNIT    N-20            DEVELOPMENT
   85-0058           1600FT FNL AND  771FT FWL, SEC 08, T11N, R013E, UM.                 ARCTIC SLOPE
     03/28/85            1605FT FSL AND 2402FT FEL, SEC 08, T11N, R013E, UM.               PRUDHOE BAY, PRUDHOE OIL POOL

 50-029-21321-00  CONOCO INC                       MILNE POINT UNIT    C-11            DEVELOPMENT
   85-0059           1068FT FSL AND 2205FT FEL, SEC 10, T13N, R010E, UM.                 ARCTIC SLOPE
     03/28/85            1863FT FNL AND 3785FT FEL, SEC 11, T13N, R010E, UM.               KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21324-00  CONOCO INC                       MILNE POINT UNIT    B-7             DEVELOPMENT
   85-0062            581FT FSL AND  760FT FWL, SEC 18, T13N, R011E, UM.                 ARCTIC SLOPE
     03/29/85            1482FT FNL AND  914FT FEL, SEC 23, T13N, R010E, UM.               KUPARUK RIVER, KUPARUK RIVER OIL POOL
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                          ALASKA DRILLING STATISTICS FOR MARCH, 1985
* RELEASABLE INFORMATION ON RECENTLY COMPLETED WELLS * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 API NUMBER        OPERATOR NAME                                WELL NAME AND NUMBER           CLASSIFICATION AND STATUS          TOTAL DEP
   PERMIT NUMBER     SURFACE LOCATION                                                            GEOLOGIC AREA                      T.V. DE
     COMPLETION DATE   BOTTOM HOLE LOCATION                                                        FIELD AND POOL

 50-733-10080-01  SHELL WESTERN E&P INC                 MGS                  A-44-2         DEVELOPMENT, 1-OIL                 11,997FT
   84-0075            1685FT FSL AND  378FT FEL, SEC 11, T08N, R013W, SM.                     COOK INLET BASIN                   10,406
     10/31/84            1619FT FSL AND  500FT FWL, SEC 01, T08N, R013W, SM.                    MIDDLE GROUND SHOAL, E, F, AND G OIL PO

 50-733-20372-00  CHAMPLIN PETROLEUM CO                 BEARD ST             1-11           EXPLORATORY, P&A                   11,350FT
   84-0177            2566FT FNL AND 2380FT FEL, SEC 11, T04N, R016W, SM.                     COOK INLET BASIN                   11,350F
     11/20/84            2566FT FNL AND 2380FT FEL, SEC 11, T04N, R016W, SM.

 50-029-21252-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2W-13          DEVELOPMENT, SUSP                   9,140FT
   84-0236            548FT FNL AND   98FT FWL, SEC 34, T12N, R009E, UM.                      ARCTIC SLOPE                        6,241F
     01/08/85            1100FT FNL AND 1221FT FEL, SEC 27, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21261-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2U-13          DEVELOPMENT, SUSP                   7,957FT
   84-0246            1283FT FSL AND 1276FT FWL, SEC 32, T12N, R009E, UM.                     ARCTIC SLOPE                        6,270F
     01/12/85            1079FT FNL AND 1202FT FEL, SEC 32, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21226-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2C-14          DEVELOPMENT, 1-OIL                  6,355FT
   84-0210            1323FT FNL AND  396FT FEL, SEC 21, T11N, R009E, UM.                     ARCTIC SLOPE                        6,213F
     01/14/85            1394FT FNL AND 1232FT FEL, SEC 21, T11N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21253-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2W-14          DEVELOPMENT, 1-OIL                  8,420FT
   84-0237            603FT FNL AND   75FT FWL, SEC 34, T12N, R009E, UM.                      ARCTIC SLOPE                        6,316F
     01/16/85            1011FT FNL AND 1452FT FWL, SEC 27, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21221-00  ARCO ALASKA INC                       PRUDHOE BAY UNIT     DS11-15        DEVELOPMENT, 1-OIL                 12,412FT
   84-0205            18FT FNL AND  131FT FEL, SEC 33, T11N, R015E, UM.                       ARCTIC SLOPE                        9,330F
     01/18/85            942FT FNL AND 2452FT FEL, SEC 04, T10N, R015E, UM.                     PRUDHOE BAY, PRUDHOE OIL POOL

 50-029-21262-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2U-14          DEVELOPMENT, SUSP                   7,180FT
   84-0247            1225FT FSL AND 1261FT FWL, SEC 32, T12N, R009E, UM.                     ARCTIC SLOPE                        6,199F
     01/18/85            1106FT FNL AND 1246FT FWL, SEC 32, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-285-20001-00  AMOCO PRODUCTION CO                   BECHAROF             1              EXPLORATORY, P&A                    9,023FT
   84-0157            500FT FNL AND 1000FT FEL, SEC 10, T28S, R048W, SM.                      BRISTOL BAY BASIN                   9,023F
     01/19/85            500FT FNL AND 1000FT FEL, SEC 10, T28S, R048W, SM.

 50-029-21254-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2W-15          DEVELOPMENT, 1-OIL                  8,242FT
   84-0238            659FT FNL AND   52FT FWL, SEC 34, T12N, R009E, UM.                      ARCTIC SLOPE                        6,245F
     01/23/85            1622FT FSL AND  978FT FEL, SEC 27, T12N, R009E, UM.                    KUPARUK RIVER, KUPARUK RIVER OIL POOL

 50-029-21263-00  ARCO ALASKA INC                       KUPARUK RIV UNIT     2U-15          DEVELOPMENT, SUSP                   7,140FT
   84-0248            1166FT FSL AND 1246FT FWL, SEC 32, T12N, R009E, UM.                     ARCTIC SLOPE                        **    F
     01/23/85            **                                                                     KUPARUK RIVER, KUPARUK RIVER OIL POOL
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ALASKA DRILLING STATISTICS FOR MARCH, 1985

* RELEASABLE INFORMATION ON RECENTLY COMPLETED WELLS *

API NUMBER PERMIT NUMBER COMPLETION DATE	OPERATOR NAME SURFACE LOCATION BOTTOM HOLE LOCATION	WELL NAME AND NUMBER	CLASSIFICATION AND STATUS GEOLOGIC AREA FIELD AND POOL	TOTAL DEP T.V. DE
50-029-21209-00 84-0192 01/27/85	ARCO ALASKA INC 1452FT FNL AND 1840FT FEL, SEC 26, T12N, R009E, UM. 1294FT FNL AND 1248FT FEL, SEC 26, T12N, R009E, UM.	KUPARUK RIV UNIT 1Q-9	DEVELOPMENT, 1-OIL ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	6,661FT 6,575F
50-029-21215-00 84-0198 01/28/85	ARCO ALASKA INC 1441FT FNL AND 1899FT FEL, SEC 26, T12N, R009E, UM. 959FT FSL AND 1226FT FEL, SEC 26, T12N, R009E, UM.	KUPARUK RIV UNIT 1Q-10	DEVELOPMENT, 1-OIL ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	7,478FT 6,462F
50-029-21255-00 84-0239 01/30/85	ARCO ALASKA INC 715FT FNL AND 29FT FWL, SEC 34, T12N, R009E, UM. 1453FT FSL AND 1629FT FWL, SEC 27, T12N, R009E, UM.	KUPARUK RIV UNIT 2W-16	DEVELOPMENT, 1-OIL ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	7,122FT 6,314F
50-029-21264-00 84-0249 01/31/85	ARCO ALASKA INC 1108FT FSL AND 1232FT FWL, SEC 32, T12N, R009E, UM. **	KUPARUK RIV UNIT 2U-16	DEVELOPMENT, SUSP ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	6,210FT ** F
50-029-21223-00 84-0207 02/03/85	ARCO ALASKA INC 1381FT FNL AND 381FT FEL, SEC 21, T11N, R009E, UM. 1052FT FSL AND 1790FT FEL, SEC 21, T11N, R009E, UM.	KUPARUK RIV UNIT 2C-13	DEVELOPMENT, 1-OIL ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	7,370FT 6,234F
50-029-21225-00 84-0209 02/05/85	ARCO ALASKA INC 1549FT FNL AND 1298FT FEL, SEC 26, T12N, R009E, UM. **	KUPARUK RIV UNIT 1Q-8	DEVELOPMENT, SUSP ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	7,387FT ** F
50-029-21273-00 85-0010 02/08/85	ARCO ALASKA INC 1224FT FNL AND 179FT FEL, SEC 33, T12N, R009E, UM. **	KUPARUK RIV UNIT 2W-1	DEVELOPMENT, SUSP ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	8,165FT ** F
50-029-21130-00 84-0093 02/10/85	SHELL WESTERN E&P INC 1542FT FSL AND 629FT FEL, SEC 11, T13N, R013E, UM. 4124FT FSL AND 2613FT FWL, SEC 24, T13N, R013E, UM.	BF-57 1	EXPLORATORY, SUSP ARCTIC SLOPE	15,455FT 11,605F
50-029-21222-00 84-0206 02/14/85	ARCO ALASKA INC 1289FT FNL AND 32FT FEL, SEC 21, T11N, R009E, UM. **	KUPARUK RIV UNIT 2C-12	DEVELOPMENT, SUSP ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	8,200FT ** F
50-029-21268-00 85-0005 02/14/85	ARCO ALASKA INC 517FT FSL AND 1081FT FWL, SEC 32, T12N, R009E, UM. 955FT FSL AND 1265FT FEL, SEC 05, T11N, R009E, UM.	KUPARUK RIV UNIT 2U-2	DEVELOPMENT, SUSP ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	8,698FT 6,209F
50-029-21234-00 84-0218 02/15/85	ARCO ALASKA INC 1560FT FNL AND 1239FT FEL, SEC 26, T12N, R009E, UM. **	KUPARUK RIV UNIT 1Q-7	DEVELOPMENT, SUSP ARCTIC SLOPE KUPARUK RIVER, KUPARUK RIVER OIL POOL	8,118FT ** FT

ALASKA DRILLING STATISTICS FOR MARCH, 1985

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* RELEASABLE INFORMATION ON RECENTLY COMPLETED WELLS * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

  API NUMBER          OPERATOR NAME                     WELL NAME AND NUMBER             CLASSIFICATION AND STATUS         TOTAL DEP
    PERMIT NUMBER       SURFACE LOCATION                                                   GEOLOGIC AREA                     T.V. DE
      COMPLETION DATE     BOTTOM HOLE LOCATION                                               FIELD AND POOL

  50-029-21260-00  ARCO ALASKA INC                     PRUDHOE BAY UNIT    DS17-12      DEVELOPMENT, SUSP                  12,031FT
    84-0245          2827FT FNL AND 1053FT FWL, SEC 22, T10N, R015E, UM.                 ARCTIC SLOPE                        **
      02/16/85         **                                                                   PRUDHOE BAY, PRUDHOE OIL POOL

  50-029-21269-00  ARCO ALASKA INC                     KUPARUK RIV UNIT    2U-3         DEVELOPMENT, SUSP                   6,865FT
    85-0006           458FT FSL AND 1066FT FWL, SEC 32, T12N, R009E, UM.                 ARCTIC SLOPE                        **
      02/19/85         **                                                                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

  50-029-21231-00  ARCO ALASKA INC                     KUPARUK RIV UNIT    2C-11        DEVELOPMENT, SUSP                   7,681FT
    84-0215          1231FT FNL AND   48FT FEL, SEC 21, T11N, R009E, UM.                 ARCTIC SLOPE                        **
      02/22/85         **                                                                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

  50-133-20375-00  ARCO ALASKA INC                     ARCO/CIRI WOLF LAKE 2            EXPLORATORY, P&A                   14,451FT
    84-0201          1183FT FSL AND 2265FT FWL, SEC 29, T07N, R009W, SM.                 COOK INLET BASIN                   14,086F
      02/23/85         2621FT FSL AND  488FT FWL, SEC 29, T07N, R009W, SM.

  50-133-20371-00  UNION OIL CO OF CALIFORNIA          KENAI BELUGA UNIT   23X-6        DEVELOPMENT, 2-GAS                  6,950FT
    84-0109           291FT FSL AND 1208FT FWL, SEC 06, T04N, R011W, SM.                 COOK INLET BASIN                    6,447F
      02/28/85         2421FT FSL AND 1704FT FWL, SEC 06, T04N, R011W, SM.                  KENAI, STERLING 5.1 GAS POOL
                                                                                            KENAI, UNDEFINED GAS POOL

  50-029-21230-00  ARCO ALASKA INC                     KUPARUK RIV UNIT    2C-10        DEVELOPMENT, SUSP                   8,300FT
    84-0214          1173FT FNL AND   63FT FEL, SEC 21, T11N, R009E, UM.                 ARCTIC SLOPE                        **
      03/03/85         **                                                                   KUPARUK RIVER, KUPARUK RIVER OIL POOL

  50-029-21259-00  ARCO ALASKA INC                     PRUDHOE BAY UNIT    DS17-11      DEVELOPMENT, SUSP                  11,505FT
    84-0244          2710FT FNL AND 1029FT FWL, SEC 22, T10N, R015E, UM.                 ARCTIC SLOPE                        **
      03/11/85         **                                                                   PRUDHOE BAY, PRUDHOE OIL POOL

    **  TO BE REPORTED

    NOTE:  ARCO ALASKA INC HAS REPORTED THE BOTTOM HOLE LOCATION FOR
                 KUPARUK RIV UNIT  1Q-12       1234FT FNL AND 1128FT FWL, SEC 26, T12N, R009E, UM.          6447FT TVD

    NOTE:  THE FOLLOWING WELL HAS A REVISED API NUMBER
                 SHELL WESTERN E&P INC         OCS Y-0181        1          #50-029-21074-00
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OUTSTANDING DRILLING PERMITS FOR ALASKA AS OF 04/02/85

OPERATOR NAME	WELL NAME AND NUMBER		API NUMBER	PERMIT	APPROVED
COOK INLET BASIN					
ALASKAN CRUDE CORP	EPPERSON KNOB UNIT	1	50-231-20008-00	84-0124	08/13/84
AMOCO PRODUCTION CO	GRANITE PT ST 18742	35	50-733-20376-00	85-0042	03/18/85
CHEVRON USA INC	BELUGA RIV UNIT	223-26	50-283-20074-00	84-0135	08/31/84
CHEVRON USA INC	BELUGA RIV UNIT	232-9	50-283-20075-00	84-0136	08/31/84
CHEVRON USA INC	BELUGA RIV UNIT	232-26	50-283-20077-00	84-0138	08/31/84
SHELL WESTERN E&P INC	MGS	A-34-11	50-733-10084-01	84-0187	10/24/84
SHELL WESTERN E&P INC	MGS	A-22A-1	50-733-20179-01	84-0169	09/19/84
SIMASKO PRODUCTION CO	SIMPCO E MOQUAWKIE	2	50-283-20072-00	84-0008	01/18/84
SIMASKO PRODUCTION CO	SIMPCO CHUITNA	1	50-283-20073-00	84-0009	01/18/84
UNION OIL CO OF CALIFORNIA	CANNERY LOOP UNIT	4	50-133-20366-00	83-0069	07/25/83
UNION OIL CO OF CALIFORNIA	TRADING BAY UNIT	K-8RD	50-733-20097-01	84-0184	10/19/84
UNION OIL CO OF CALIFORNIA	TRADING BAY ST	A-14RD	50-733-20099-01	84-0045	03/27/84
UNION OIL CO OF CALIFORNIA	TRADING BAY UNIT	D-29RD	50-733-20292-01	85-0003	01/11/85
UNION OIL CO OF CALIFORNIA	TRADING BAY UNIT	D-43	50-733-20373-00	84-0185	10/19/84
UNION OIL CO OF CALIFORNIA	TRADING BAY UNIT	G-29	50-733-20374-00	84-0186	11/23/84
ARCTIC SLOPE					
ALASKAN CRUDE CORP	BURGLIN	33-1	50-029-21106-00	84-0059	04/26/84
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS7-23	50-029-20947-00	83-0065	04/18/83
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS14-37	50-029-21064-00	83-0189	12/30/83
ARCO ALASKA INC	KUPARUK RIV UNIT	CPF-2	50-029-21111-00	84-0068	04/30/84
ARCO ALASKA INC	PBU EXXON TR	19-11-15	50-029-21181-00	84-0156	08/31/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1L-14	50-029-21205-00	84-0188	10/17/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-6	50-029-21224-00	84-0208	12/04/84
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS11-13	50-029-21229-00	84-0213	11/30/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-5	50-029-21233-00	84-0217	12/04/84
ARCO ALASKA INC	KUPARUK RIV UNIT	2C-9	50-029-21237-00	84-0221	12/04/84
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS11-8	50-029-21245-00	84-0229	12/07/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-1	50-029-21247-00	84-0231	12/18/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-2	50-029-21248-00	84-0232	12/18/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-3	50-029-21249-00	84-0233	12/18/84
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-4	50-029-21250-00	84-0234	12/18/84
ARCO ALASKA INC	KRU W SAK	26	50-029-21251-00	84-0235	12/18/84
ARCO ALASKA INC	PRUDHOE BAY UNIT	L1-9	50-029-21265-00	85-0001	01/10/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-1	50-029-21267-00	85-0004	01/16/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-4	50-029-21270-00	85-0007	01/16/85
ARCO ALASKA INC	PRUDHOE BAY UNIT	L2-30	50-029-21272-00	85-0009	01/21/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2W-3	50-029-21274-00	85-0011	01/28/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2W-4	50-029-21275-00	85-0012	01/28/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2W-2	50-029-21279-00	85-0016	01/28/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-5	50-029-21281-00	85-0018	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-6	50-029-21282-00	85-0019	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-7	50-029-21283-00	85-0020	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-8	50-029-21284-00	85-0021	02/19/85
ARCO ALASKA INC	HEMI SPRINGS UNIT	3	50-029-21285-00	85-0022	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	3B-13	50-029-21286-00	85-0023	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	3B-14	50-029-21287-00	85-0024	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	3B-15	50-029-21288-00	85-0025	02/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	3B-16	50-029-21289-00	85-0026	02/19/85
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS9-27	50-029-21291-00	85-0028	02/26/85
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS9-28	50-029-21292-00	85-0029	03/05/85

OUTSTANDING DRILLING PERMITS FOR ALASKA AS OF 04/02/85

OPERATOR NAME	WELL NAME AND NUMBER		API NUMBER	PERMIT	APPROVED
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-13	50-029-21293-00	85-0030	03/05/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-14	50-029-21294-00	85-0031	03/05/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-15	50-029-21295-00	85-0032	03/05/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-16	50-029-21296-00	85-0033	03/05/85
ARCO ALASKA INC	PRUDHOE BAY UNIT	L2-28	50-029-21298-00	85-0035	03/05/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-9	50-029-21300-00	85-0037	03/07/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-9	50-029-21301-00	85-0038	03/11/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-10	50-029-21302-00	85-0039	03/11/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-11	50-029-21303-00	85-0040	03/11/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2U-12	50-029-21304-00	85-0041	03/11/85
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-13	50-029-21306-00	85-0044	03/18/85
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-14	50-029-21307-00	85-0045	03/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-15	50-029-21308-00	85-0046	03/18/85
ARCO ALASKA INC	KUPARUK RIV UNIT	1Q-16	50-029-21309-00	85-0047	03/18/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-10	50-029-21310-00	85-0048	03/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-11	50-029-21311-00	85-0049	03/19/85
ARCO ALASKA INC	KUPARUK RIV UNIT	2V-12	50-029-21312-00	85-0050	03/18/85
ARCO ALASKA INC	PRUDHOE BAY UNIT	DS9-35	50-029-21314-00	85-0052	03/20/85
ARCO ALASKA INC	PRUDHOE BAY UNIT	L1-1	50-029-21317-00	85-0055	03/27/85
ARCO ALASKA INC	KUPARUK RIV UNIT	3B-1	50-029-21318-00	85-0056	03/28/85
ARCO ALASKA INC	KUPARUK RIV UNIT	3B-2	50-029-21319-00	85-0057	03/28/85
ARCO ALASKA INC	BRONTOSAURUS	1	50-163-20004-00	84-0001	10/05/84
CHEVRON USA INC	KIC WELL	1	50-025-20001-00	84-0178	10/02/84
CONOCO INC	MILNE POINT UNIT	C-5A	50-029-21244-01	84-0243	12/21/84
CONOCO INC	MILNE POINT UNIT	C-6	50-029-21257-00	84-0241	12/21/84
CONOCO INC	MILNE POINT UNIT	CFP-2	50-029-21258-00	84-0242	12/21/84
CONOCO INC	MILNE POINT UNIT	C-7	50-029-21266-00	85-0002	02/22/85
CONOCO INC	MILNE POINT UNIT	CFP-1	50-029-21271-00	85-0008	01/16/85
CONOCO INC	MILNE POINT UNIT	B-6	50-029-21276-00	85-0013	01/28/85
CONOCO INC	MILNE POINT UNIT	C-8	50-029-21277-00	85-0014	01/24/85
CONOCO INC	MILNE POINT UNIT	C-10	50-029-21278-00	85-0015	01/28/85
CONOCO INC	MILNE POINT UNIT	B-10	50-029-21280-00	85-0017	02/01/85
CONOCO INC	MILNE POINT UNIT	B-9	50-029-21297-00	85-0034	03/01/85
CONOCO INC	MILNE POINT UNIT	C-9	50-029-21299-00	85-0036	03/08/85
CONOCO INC	MILNE POINT UNIT	B-11	50-029-21305-00	85-0043	03/13/85
CONOCO INC	MILNE POINT UNIT	C-11	50-029-21321-00	85-0059	03/28/85
CONOCO INC	MILNE POINT UNIT	B-7	50-029-21324-00	85-0062	03/29/85
EXXON CORP	ALASKA ST K	1	50-179-20008-00	83-0046	03/15/83
SHELL WESTERN E&P INC	OCS Y-0180	1	50-029-21236-00	84-0220	11/30/84
SOHIO ALASKA PETROLEUM CO	PRUDHOE BAY UNIT	Y-14	50-029-20951-00	83-0070	05/03/83
SOHIO ALASKA PETROLEUM CO	PRUDHOE BAY UNIT	S-18	50-029-21156-00	84-0125	07/31/84
SOHIO ALASKA PETROLEUM CO	SAG DELTA	11	50-029-21203-00	84-0182	10/09/84
SOHIO ALASKA PETROLEUM CO	NIAKUK	4	50-029-21217-00	84-0200	12/04/84
SOHIO ALASKA PETROLEUM CO	NIAKUK	5	50-029-21290-00	85-0027	02/19/85
SOHIO ALASKA PETROLEUM CO	PRUDHOE BAY UNIT	A-35	50-029-21313-00	85-0051	03/22/85
SOHIO ALASKA PETROLEUM CO	PRUDHOE BAY UNIT	N-20	50-029-21320-00	85-0058	03/28/85
TEXACO INC	JONES ISLAND	1	50-029-21174-00	84-0148	10/02/84
TEXACO INC	COLVILLE DELTA	1	50-103-20038-00	84-0149	08/31/84

ALASKA PRODUCTION AND INJECTION SUMMARY BY ACTIVE FIELDS FOR FEBRUARY, 1985

OIL FIELDS	CRUDE OIL (BBL)	WATER (BBL)	GAS (MCF)	PROD. WELLS	ADDL COMPS	CUM CRUDE OIL (BBL)	CUM WATER (BBL)	CUM GAS (MCF)
BEAVER CREEK	11,836	18	10,519	2		3,055,771	17,351	1,225,120
GRANITE POINT	238,035	79,406	159,827	28		98,318,886	4,627,655	85,631,718
KUPARUK RIVER	5,772,200	1,381,304	7,929,957	201		130,677,564	36,801,163	141,375,338
MCARTHUR RIVER	729,253	1,649,540	383,319	62	8	500,498,270	168,897,205	182,879,807
MIDDLE GROUND SHOAL	222,339	375,919	163,537	38	2	144,441,693	59,806,086	72,478,564
PRUDHOE BAY	45,333,314*	5,170,988	72,966,766	495		3,877,705,304**	128,310,501	4,661,473,630
SWANSON RIVER	178,241	151,657	7,684,763	38		201,430,648	61,737,981	1,497,822,294
TRADING BAY	78,048	107,243	79,735	29	10	86,222,934	54,689,810	57,910,369
TOTAL ACTIVE FIELDS	52,563,266	8,916,075	89,378,423	893	20	5,042,351,070	514,887,752	6,700,796,840
DAILY AVERAGE	1,877,259	318,431	3,192,086					
TOTAL INACTIVE						155,596	249	456
TOTAL ALL FIELDS						5,042,506,666	514,888,001	6,700,797,296

NGL PRODUCTION	NGL (BBL)	CUM NGL (BBL)
MCARTHUR RIVER	21,470	8,245,553
PRUDHOE BAY	5,267	1,838,621
SWANSON RIVER	2,059	1,078,853
TRADING BAY	338	353,051
TOTAL ACTIVE FIELDS	29,134	11,516,078
DAILY AVERAGE	1,040	
TOTAL INACTIVE		0
TOTAL ALL FIELDS		11,516,078

GAS FIELDS	CONDEN. (BBL)	WATER (BBL)	GAS (MCF)	PROD. WELLS	ADDL COMPS	CUM CONDEN. (BBL)	CUM WATER (BBL)	CUM GAS (MCF)
BEAVER CREEK		2,535	896,199	4			33,595	20,767,693
BELUGA RIVER			1,760,592	9			810	184,958,617
EAST BARROW			65,312	5			109	2,262,884
KENAI		1,910	10,339,811	35	23	11,877	405,098	1,561,788,437
LEWIS RIVER			143,378	2				1,073,655
MCARTHUR RIVER			735,875	5				109,374,119
MIDDLE GROUND SHOAL			41,762	1				1,069,782
NORTH COOK INLET		503	3,855,932	12			70,987	695,931,582
SOUTH BARROW			83,137	6			12	16,099,945
STERLING			2,335	1				2,078,539
TRADING BAY			32,687	1				2,041,854
WEST FORK			993	1				1,520,234
TOTAL ACTIVE FIELDS		4,948	17,958,013	82	23	11,877	510,611	2,598,967,341
DAILY AVERAGE		176	641,357					
TOTAL INACTIVE						0	0	14,459,437
TOTAL ALL FIELDS						11,877	510,611	2,613,426,778

INJECTION PROJECTS	OIL (BBL)	WATER (BBL)	GAS (MCF)	INJ. WELLS	ADDL COMPS	CUM OIL (BBL)	CUM WATER (BBL)	CUM GAS (MCF)
GRANITE POINT		808,585		21			111,973,243	
KUPARUK RIVER		1,368,897	6,913,270	29			37,392,338	117,694,516
MCARTHUR RIVER		3,159,302		18	2		813,670,886	63,034
MIDDLE GROUND SHOAL		707,029		20			237,532,461	
PRUDHOE BAY		31,965,729	65,409,729	103		13,012,875	286,421,477	4,221,049,356
SWANSON RIVER			7,437,989	8			8,471,561	1,717,713,992
TRADING BAY		27,772		2	1		120,808,192	
TOTAL ACTIVE FIELDS		38,037,314	79,760,988	201	3	13,012,875	1,616,270,158	6,056,520,898
DAILY AVERAGE		1,358,475	2,848,606					
TOTAL INACTIVE						0	0	547,457
TOTAL ALL FIELDS						13,012,875	1,616,270,158	6,057,068,355

*INCLUDES 1,139,064 BBLS OF CONDENSATE
**INCLUDES 56,730,376 BBLS OF CONDENSATE